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THE MICRO USER

Volume 2
Number 6
August 1984
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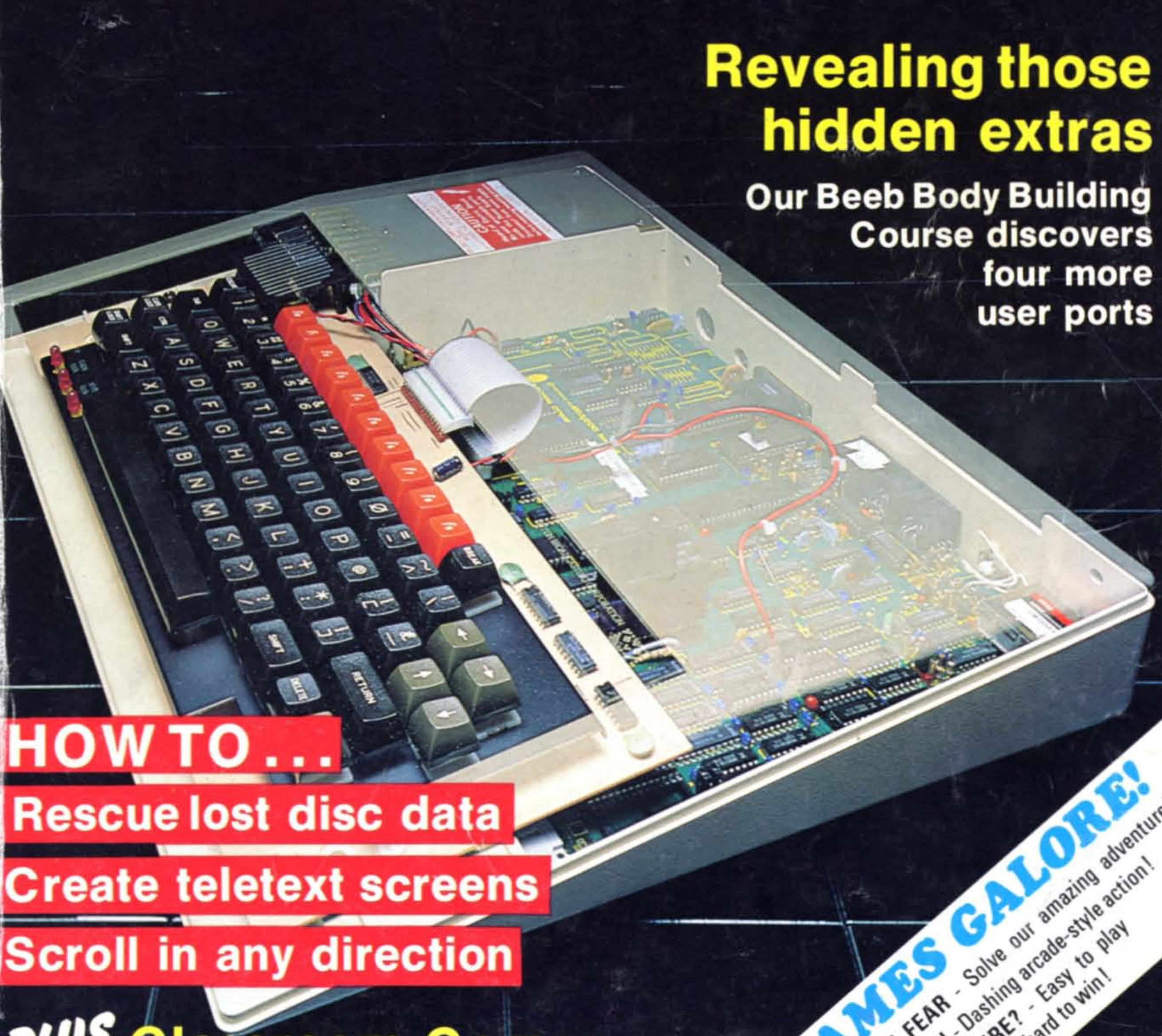

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The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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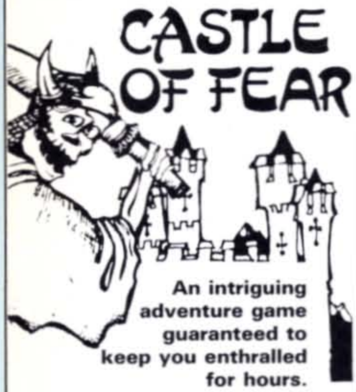
GAME of the MONTH



An intriguing adventure game guaranteed to keep you enthralled for hours.

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We present Difference Square, a useful maths program aimed at the primary classroom.

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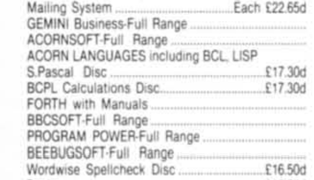
Continued on page **11**

PRINTERS



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Preliminary Information

- **The new Eprom Programmer will now program 2516, 2532, 2564, 2716, 2732, 2764, 27128 and 27256 + 5v eproms, and all but the 27256 in a single pass.**
- The programmer will be supplied with integral power supply, and interfaces with the BBC via the 1MHz bus. It is fully buffered and complies with Acorn protocols. There is no power drain from the computer.
- **No knobs or switches to fiddle with — total control from the keyboard**
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- **Eprom type selectable from the keyboard**
- Selectable programming voltage 25/21/12.5V
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- Continuous screen display of eprom type, option and address range selected.
- **Full screen editor with HEX or ASCII input. Constant display of logical eprom adress and the actual ram address.**
- Can read, blank check, program and verify at any address/addresses on the eprom.
- **Full Tape/Disc filing facility.**
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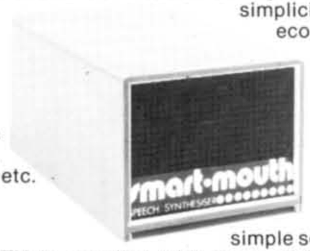

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It is a FILE which contains RECORDS. Records consist of a number of FIELDS containing the information—an analogy can be drawn with a card index in which a box of cards is the file. Each card is a record and each line on the card is a field.

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2) File Size—99K (40 track), 199K (80 track) —65,000 + records
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4) Field Size—up to 254 characters with complete line scanning
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The original REPLICA set a very high standard so the specification we set our chief programmer included some impossible features. In fact ACORN state that some of the things that we have done are impossible, it just took us longer that's all. REPLICA II transfers most cassette based programs to disk, even more than REPLICA. When you buy disk drives you do not have to throw away expensive cassette based programs.

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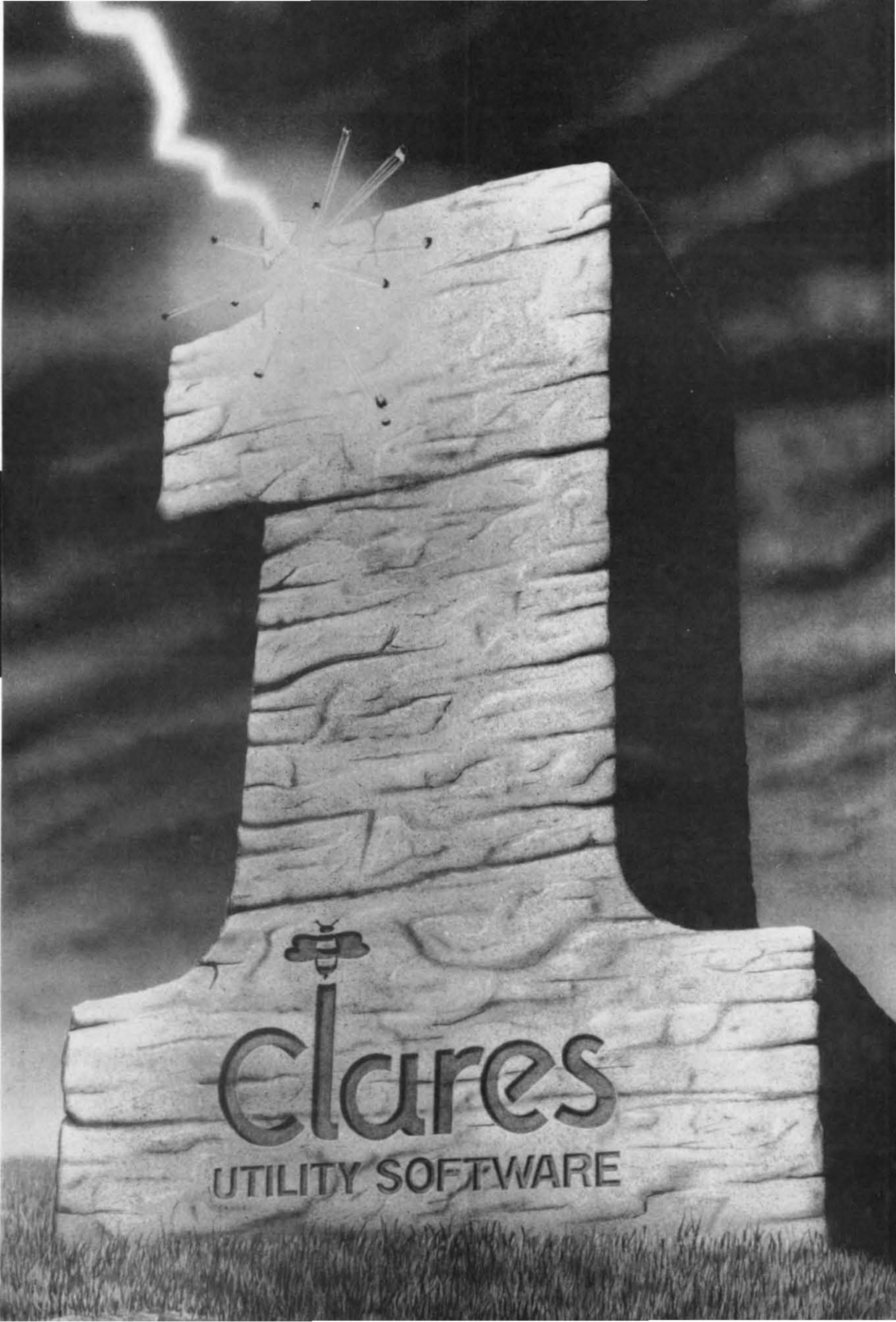
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102f ACCOUNT £29.95 B D
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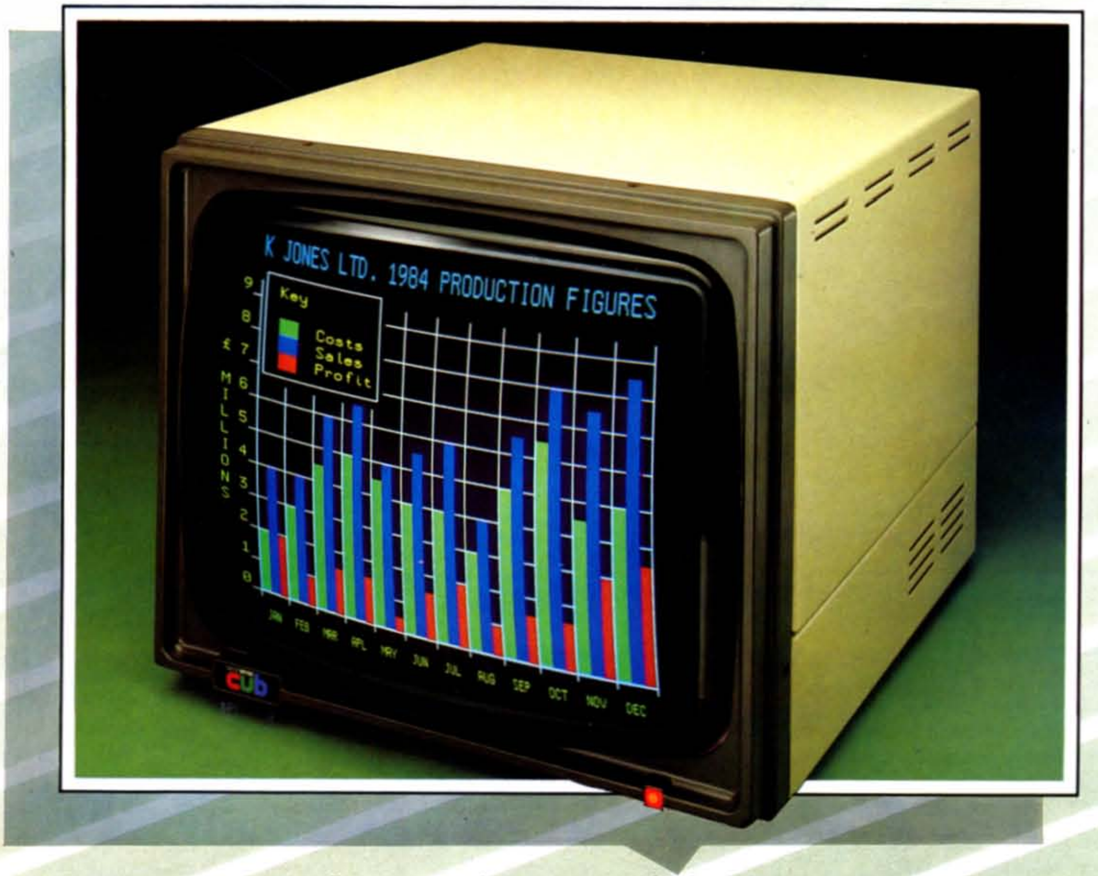

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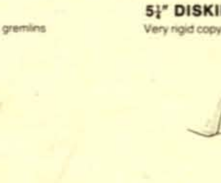

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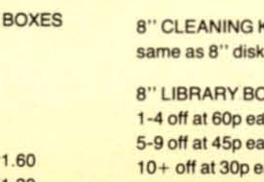

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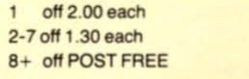

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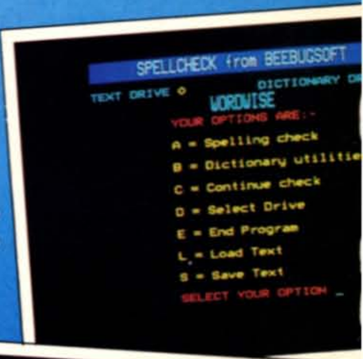
This software has been produced by the BBC user group BEEBUG for its members. BEEBUG members tend to be a demanding and discerning group of individuals; and the range of software produced has been kept to a consistently high standard through their constant vigilance.

As a result, BEEBUG software is highly acclaimed amongst BEEBUG's 25,000 members. Independent reviews from the major computing magazines seem to take a similar view of the software, as you can see from their comments.

SPELLCHECK

The disc based spelling checker for text created on Wordwise or View.

"... invaluable ... fast and reliable ... a worthwhile investment"
PCN February 1984



```
          SPELLCHECK from BEEBUGSOFT
TEXT DRIVE 0              DICTIONARY DR
                WORDWISE
          YOUR OPTIONS ARE:-
          A = Spelling check
          B = Dictionary utilitie
          C = Continue check
          D = Select Drive
          E = End Program
          L = Load Text
          S = Save Text
          SELECT YOUR OPTION _
```

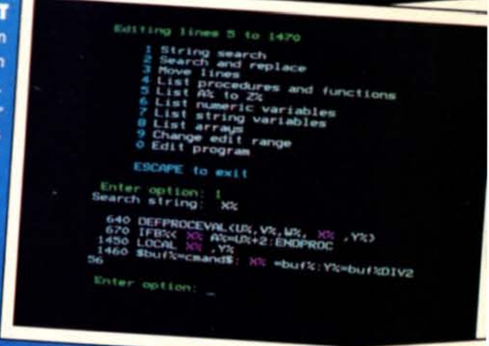
TOOLKIT

27 new commands in eprom to speed up Basic program development and debugging.

"... an indispensible aid"
EDUCATIONAL COMPUTING March 1984

"... worth every penny ... highly recommended"
COMPUTING TODAY June 1984

"... its range of utilities is excellent"
MICRONET May 1984



```
Editing lines 5 to 1470

    1 String search
    2 Search and replace
    3 Move lines
    4 List procedures and functions
    5 List A% to Z%
    6 List numeric variables
    7 List string variables
    8 List arrays
    9 Change edit range
    0 Edit program

   ESCAPE to exit

 Enter option: 1
Search string:  X%

  640 DEFPROCEVAL(U%,V%,W%, X% ,Y%)
  670 IFB%< X% A%=U%+2:ENDPROC
 1450 LOCAL X% ,Y%
 1460 $buf%=cmand$: X% =buf%:Y%=buf%DIV2
56

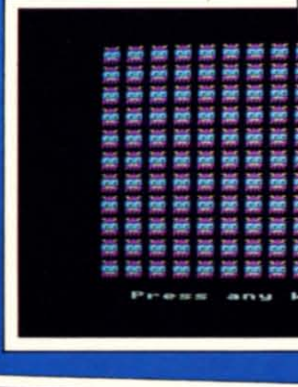
Enter option: _
```

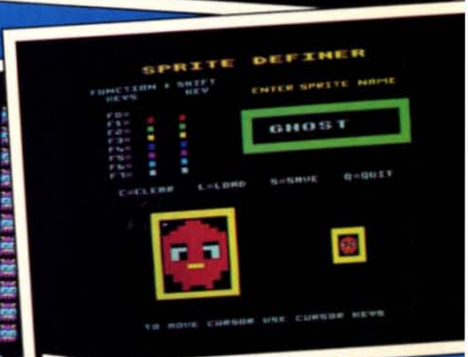
SPRITE UTILITIES

A game writers utility pack enabling high speed arcade games to be quickly written in Basic.

"... definitely recommended ... excellent"
ELECTRONICS AND COMPUTING May 1984

"... Sprite Utilities wins through"
ACORN USER May 1984



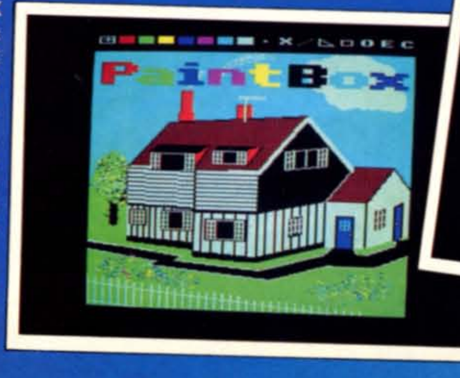


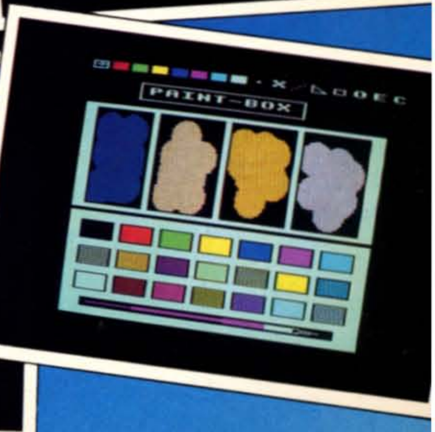
PAINTBOX

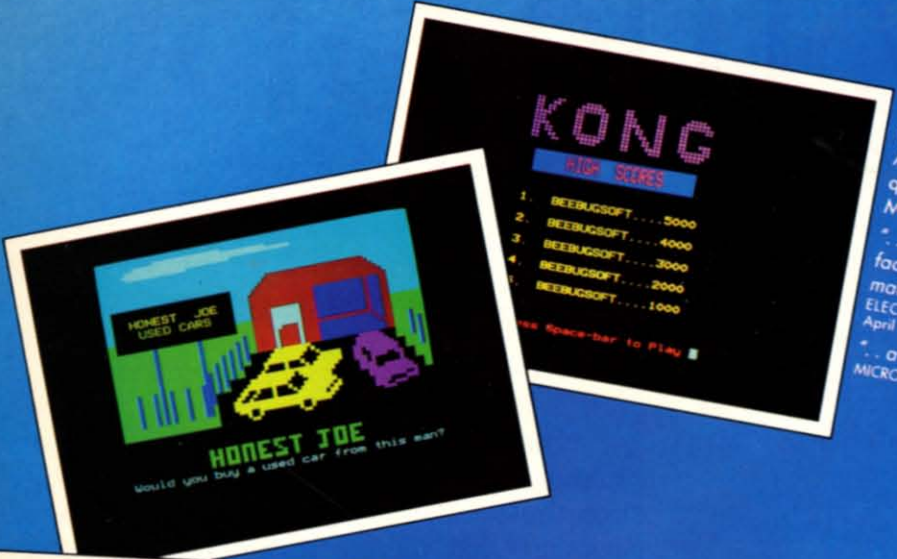
Probably the ultimate joystick drawing package on the BBC Micro, great fun and highly educational.

"... amazingly versatile ... easy to use ... (one of the most feature laden picture creating programs around) ... tremendous potential"
EDUCATIONAL COMPUTING Jan 1984

"... a very sophisticated and versatile utility"
ELECTRONICS AND COMPUTING May 1984





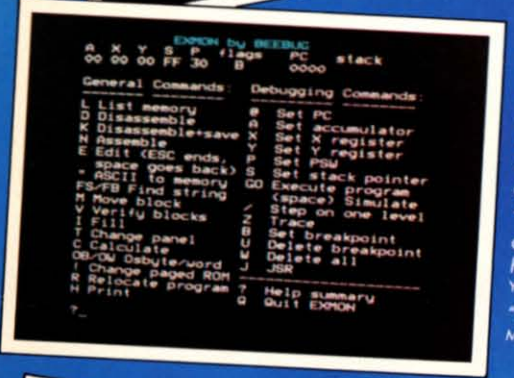


```
KONG
HIGH SCORES
1.  BEEBUGSOFT....5000
2.  BEEBUGSOFT....4000
3.  BEEBUGSOFT....3000
4.  BEEBUGSOFT....2000
5.  BEEBUGSOFT....1000
ess Space-bar to Play
```

TELETEXT PACK
A powerful screen editor for quickly creating Teletext Mode 7 screens.

". . provides teletext editing facilities in a well thought out manner"
ELECTRONICS AND COMPUTING April 1984

". . a very neat utility"
MICRONET April 1984



```
            EXMON by BEEBUG
 A  X  Y  S  P  flags    PC     stack
00 00 00 FF 30    B     0000

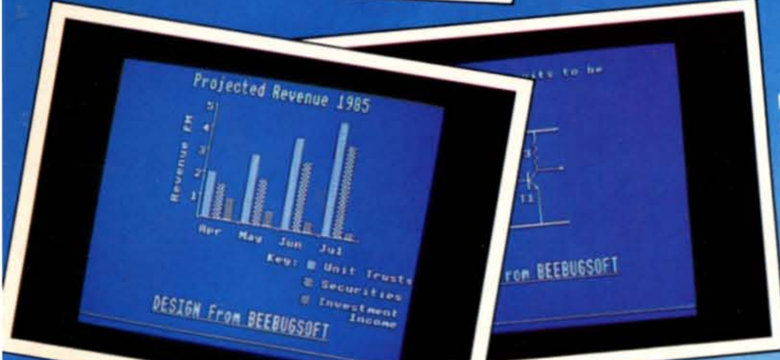
General  Commands:    Debugging  Commands:

L List memory          @  Set PC
D Disassemble          A  Set accumulator
K Disassemble+save     X  Set X register
N Assemble             Y  Set Y register
E Edit (ESC ends,      P  Set PSW
  space goes back)     S  Set stack pointer
= ASCII to memory      GO Execute program
FS/FB Find string         (space) Simulate
M Move block           /  Step on one level
V Verify blocks        Z  Trace
I Fill                 B  Set breakpoint
T Change panel         U  Delete breakpoint
C Calculate            W  Delete all
OB/OW Osbyte/word      J  JSR
! Change paged ROM     ---------------------
R Relocate program     ?  Help summary
H Print                Q  Quit EXMON
?_
```

EXMON
An extremely powerful machine code monitor on cassette or eprom, offering 35 new commands for debugging machine-code.

". . exceptionally comprehensive . . . would be hard to improve upon"
YOUR COMPUTER August 1983

". . using EXMON is a delight"
MICRONET May 1984

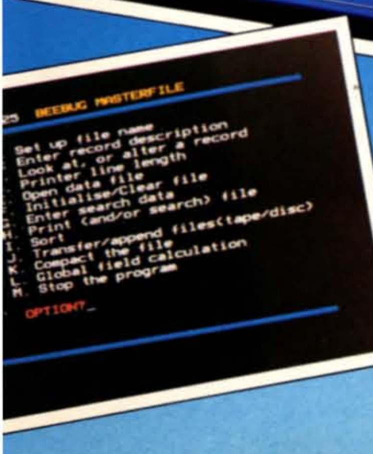


DESIGN
A Computer Aided Design package to allow screens to be quickly created for display, demonstration, handouts etc.

". . a first rate screen processor . . . immense value to schools and colleges"
EDUCATIONAL COMPUTING April 1984

If you would like to know more about BEEBUGSOFT products, see the advertisers' index of this magazine, or telephone us for a full software brochure.

BEEBUGSOFT products may now be obtained from major dealers including selected branches of W.H. Smith.



```
25  BEEBUG MASTERFILE

    Set up file name
    Enter record description
    Look at, or alter a record
    Printer line length
    Open data file
    Initialise/Clear file
    Enter search data
    Print (and/or search) file
 H. Sort
 I. Transfer/append files(tape/disc)
 J. Compact the file
 K. Global field calculation
 L. Stop the program
 M. Stop the program

    OPTION?_
```

MASTERFILE
A flexible general purpose database on cassette or disc; the disc version using random access files.

". . works well and offers an efficient database"
PCN November 1983

Alternatively all products are available from us on mail order from our despatch department in High Wycombe.

BEEBUGSOFT dept 16 PO BOX 109
HIGH WYCOMBE BUCKS HP10 8HQ

TEL: ST. ALBANS (0727) 60263

Now, the BBC

The BBC Micro has now taken a giant step into the world of business computing.

With the addition of its new Z80 second processor, it is the first computer at anywhere near its price to become fully compatible with CP/M software.

As most business computer users can verify, CP/M is the most widely used form of software in business today.

For £299, you're well and truly in business.

At £299, the Z80 adds 64K of usable RAM to the BBC Micro. And it allows you to use the CP/M 2.2 computer operating system.

It's extremely fast.

And besides giving you access to a vast new area of software, it enables you to use GSX graphics–based programs, the perfect complement to the BBC Micro's own superb graphics.

Free software and languages.

The Z80 second processor comes complete with five CP/M business programs.

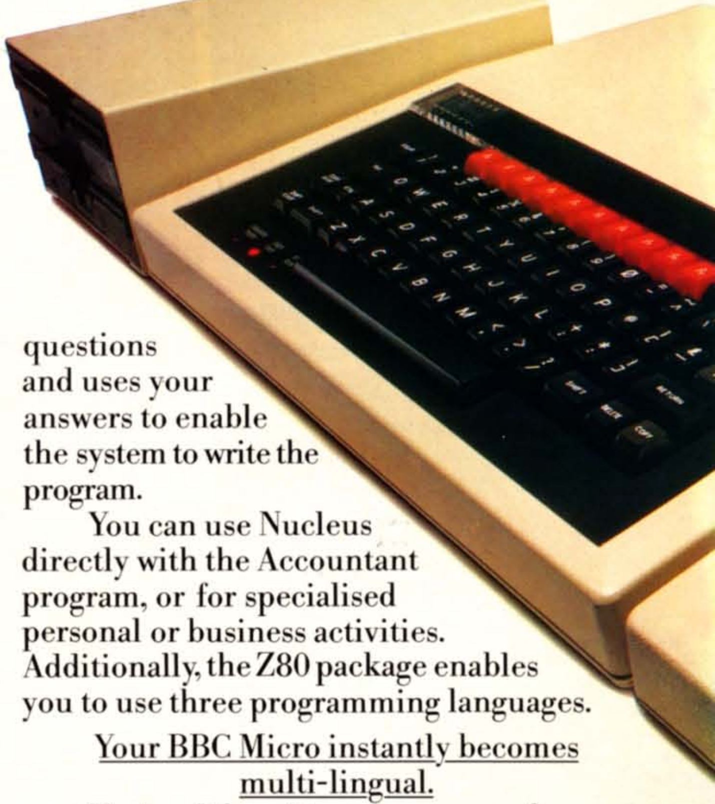
To handle your word processing, there's MemoPlan. It's a program with some highly sophisticated features, such as a safeguard against data loss through power cuts and the ability to show two documents simultaneously on the screen.

To form your CP/M personal database, there's FilePlan. It stores names, addresses, telephone numbers, stock listings and more. And if you use it with MemoPlan, you can generate personalised letters, labels and mail shots.

To produce forecasts and analyse groups of figures diagramatically, simply use the GraphPlan program. This is incredibly helpful in working out vital business calculations, converting them into graphs and charts.

Meanwhile, in the book-keeping department, there's the Accountant program. Use it to enter day-to-day transactions into the computer. Then, at any time, you can ask the computer to produce lists, summaries, reports, audit trails and trial balances. You can readily expand this package to a fully ledger based system, complete with payroll and more.

Finally, to help you to develop your own programs without having specialised experience, the Z80 comes with another software package called Nucleus. It's a system generator which asks you questions and uses your answers to enable the system to write the program.



You can use Nucleus directly with the Accountant program, or for specialised personal or business activities. Additionally, the Z80 package enables you to use three programming languages.

Your BBC Micro instantly becomes multi-lingual.

To simplify writing your own software with the Z80, there's BBC BASIC.

For running professionally written business programs, there's Professional BASIC.

And then there's CIS COBOL, the leading microcomputer version of COBOL, the language used in mainframe computer applications throughout commerce and industry.

With CIS COBOL, the Z80 also gives you two sophisticated programming aids.

CP/M is a registered trademark of Digital Research Inc.

Macro.

One is Animator, an award winning debugging tool which enables you to identify programming errors quickly and easily.

The other is FORMS 2, which helps you to write your own interactive programs in COBOL.

With all these sophisticated features, the Z80 package is exceptional value for money. Indeed, bought separately the programs and languages could cost as much as £3,000.

See the Z80 at work.

The Z80 second processor is designed to be used with the BBC Micro Model B incorporating a Series 1.2 Machine Operating System and linked to a dual 80-track disc drive, a printer and monitor.

Ask your BBC Micro dealer to show you just how far it can go in the world of serious business computing.

For your nearest dealer, ring 01-200 0200.

Technical specification.

The Z80 has a 64K Random Access Memory, running CP/M 2.2 which provides approximately 55K bytes of RAM for user programs.
It operates at a clock rate of 6MHz.
Power supply is integral. Height, 70mm. Width, 210mm. Depth, 350mm.

Z80 second processor with CP/M business package. £299.
Z80 SECOND PROCESSOR
BRITISH BROADCASTING CORPORATION
MICROCOMPUTER SYSTEM

The BBC Microcomputer System.

Designed, produced and distributed by Acorn Computers Limited.

Increase your fire power!

More than just a joystick—a system

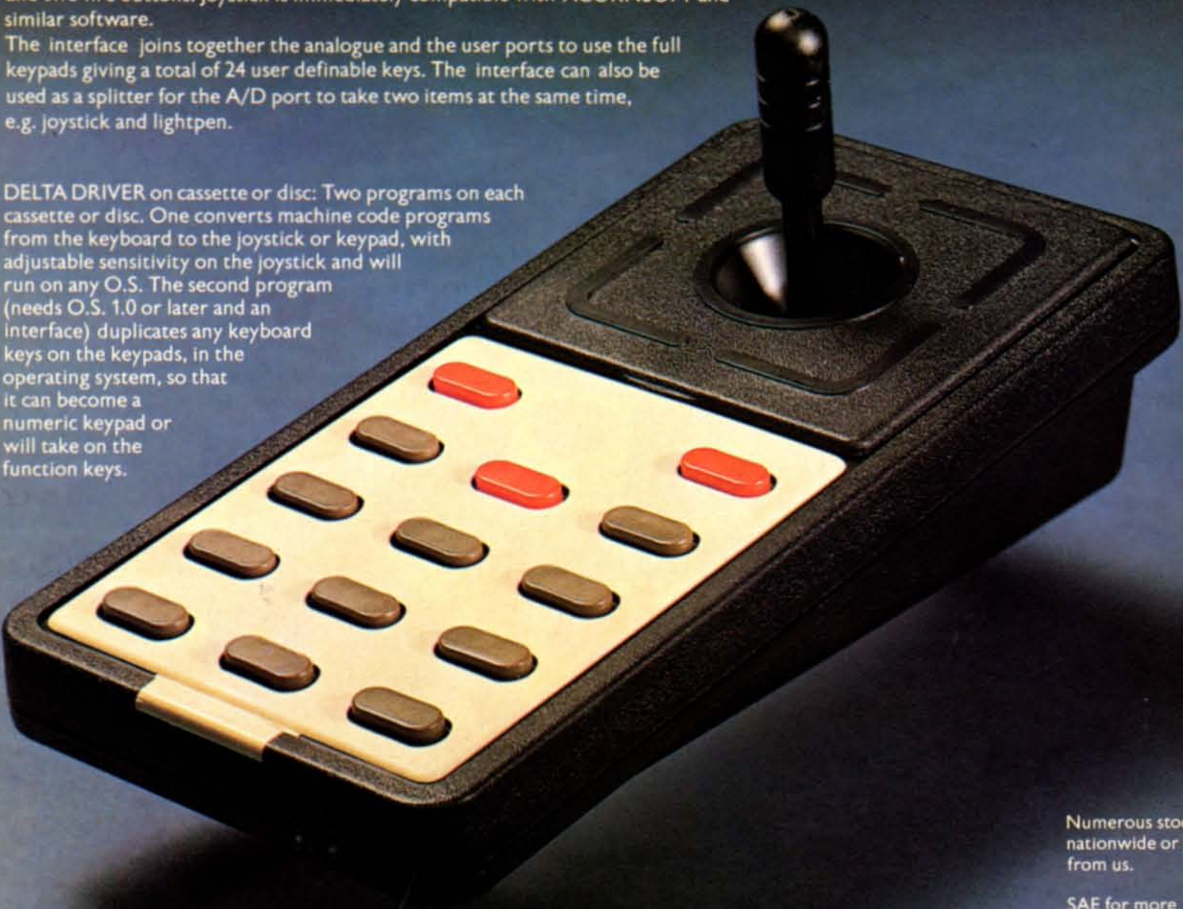
- ▲ Nylon encased—Steel shafted joystick with ball and socket joint.
- ▲ Fast sprung return to centre.
- ▲ Graphite wiper linear potentiometers.
- ▲ 12 Months Guarantee.
- ▲ 7 day Money back Guarantee (on Hardware).

Complete control at your fingertips

A superb joystick and a keypad for the price of either one. Plus the software to integrate it into the computer's system. One handset will work on it's own in the A/D port as a joystick and two fire buttons. Joystick is immediately compatible with ACORNSOFT and similar software.

The interface joins together the analogue and the user ports to use the full keypads giving a total of 24 user definable keys. The interface can also be used as a splitter for the A/D port to take two items at the same time, e.g. joystick and lightpen.

DELTA DRIVER on cassette or disc: Two programs on each cassette or disc. One converts machine code programs from the keyboard to the joystick or keypad, with adjustable sensitivity on the joystick and will run on any O.S. The second program (needs O.S. 1.0 or later and an interface) duplicates any keyboard keys on the keypads, in the operating system, so that it can become a numeric keypad or will take on the function keys.



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Made in England

DELTA 14b HANDSET £14.95
DELTA 14b/1 A/D/USER PORT INTERFACE £14.85
DELTA DRIVER CASSETTE £5.95 or DISC £9.95
Prices include VAT and P&P.

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THE MICRO USER

AUGUST 1984

NEWS

Acorn testing Winchesters

ACORN is currently conducting secret field trials on Winchester disc drives.

So clandestine is the operation that the company will not reveal either which company is involved in manufacturing them or when the results will be available.

"Although the trials are underway, I am not at liberty to reveal any other information for the moment", said an Acorn spokesman.

QL claim gets thumbs down

A CLAIM by Sir Clive Sinclair that the QL will eventually topple the BBC Micro from its number one spot in education has been dismissed as groundless by Acorn.

The forecast came from the millionaire boss of Sinclair Research during a recent in-depth interview.

"They are not going to throw out the BBC machine overnight", said Sir Clive, "but as they replace them, or buy new machines, they will go for the QL, partly because it will be the university standard and more so because it is so much better value".

An Acorn spokesman was quick to pour cold water on the suggestion.

"The QL has not been highly rated for its educational value by professional reviewers", he told *The Micro User*.

"Unlike the BBC Micro, which was something the schools needed at the time, the QL doesn't meet the educational requirements as well – even if it is a more sophisticated box".

The spokesman also took exception to Sir Clive's thinly disguised suggestion that the BBC Micro is now getting long in the tooth.

"It is a machine with nine lives", he claimed, "and this is the case because its active life span is increased with each peripheral and expansion unit that comes out for it.

"The truth of the matter is that the schools are still very happy with it".

Sir Clive .. hopes to topple the BBC Micro

Nor does the Acorn spokesman give much credibility to Sir Clive's prediction that the QL will make its impact on the educational market from the top down.

For Sinclair is convinced that once the QL has been adopted by the universities the schools will follow.

"On the contrary, the reverse is true", insisted the man from Acorn.

"It has always been the case that the schools have taught the universities how to use computers.

"The most innovative teaching in this field is at primary, and not secondary, level.

"So if anything, the influence is from the bottom up and not the top down".

Acorn is also certain that if the QL does make even minor inroads into the British educational scene it will not happen overnight.

"Schools certainly do not turn round hardware quickly", said the spokesman. "And as half the schools only bought their BBC Micros last year Sinclair has got a long time to wait before any money becomes available to them to buy new equipment.

"It all adds up to the fact that the BBC Micro is going to remain number one in schools for a long time to come".

On the road to RUIN

THE road safety section of Notts County Council has devised an education game for the BBC Micro, called RUIN – Road User INsurance.

Aimed at children of 11 upwards, the game can be played by up to six groups with just one micro. Each simulation can be set to last from 30 minutes to more than two hours.

Teams act as insurance companies quoting rates for different road users randomly generated by the micro. The winners are those who make most money by best assessing the risks.

The game comes on floppy disc at £11.

Ruin can form the nucleus of a class project supported by extra materials and visits by local road safety officers and insurance company representatives.

.. and Intec launches range for the Beeb

HARD disc manufacturer Intec has launched a range of Winchester addons for the BBC Micro.

It offers mass storage in 5, 10 and 20 mbyte units in both fixed and removable cartridge versions.

Also included are such features as logon, passwords and directory subvolumes plus built-in diagnostics for hardware problems, software bugs and user errors.

From a cold start a system can be set up, installed and ready for use in minutes, claims Intec.

More games on disc

MICROPOWER is the latest software house to offer games on disc for the BBC Micro.

The first 11 titles will be disc versions of its most popular games, packed in smart vinyl wallets with full-colour artwork and screen photos of the games in action.

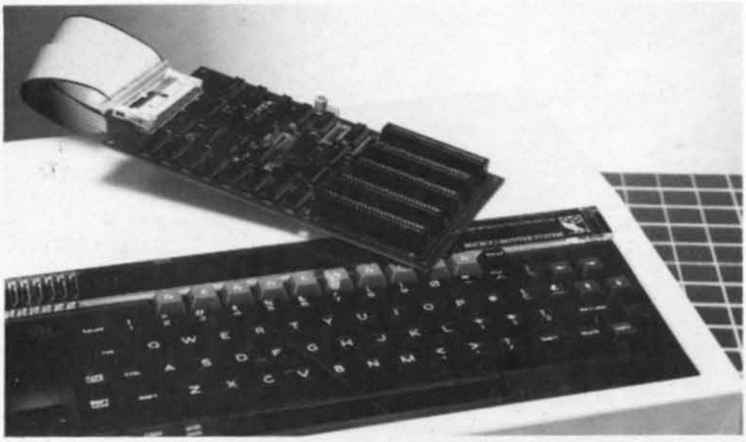
The discs will work on either 40 or 80-track drives.

The rest of Micropower's titles will be available too, but without the fancy packaging.

Customers who have Micropower games cassettes will be offered a trade-in allowance of £5 each against the disc versions.

Says director Chris Payne: "Now that a disc drive is the most popular buy for Beeb owners, we expect to sell one game on disc for every four we sell on cassettes".

Plug in your Apple card here...



BBC Micro users can now expand the capabilities of their machines using standard interface cards made for the veteran Apple II.

The idea comes from Xcalibur Computers of Northampton who have brought out an input/output backplane that plugs into the back of the BBC Micro.

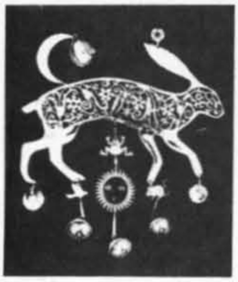
This gadget does two things. It gives the BBC an extra 64k RAM and has five slots for Apple cards.

This means the user can choose from thousands of Apple cards and get instant extra applications.

In use, the I/O addresses of the Apple are mapped onto defined addresses on the BBC, which then drives the cards through Basic commands or assembler.

According to Xcalibur's Jeff Barringer, the biggest gainers will be scientific and laboratory workers.

They will benefit from the BBC's ease of programming and better display, combined with the vast library of scientific cards available for the Apple II.



'Masquerade' hare comes to show

A MAJOR security operation is to be mounted at the Electron and BBC Micro User Show in London when an internationally famed gold artefact goes on display.

Known as the "Jewelled Hare of Masquerade", it has recently been acquired by a London software house which has agreed to loan it for the duration of the four day event.

Valued at £30,000, it will be under round-the-clock surveillance at Alexandra Palace, where it will provide a feature attraction for visitors.

Set with precious stones, the "Jewelled Hare" was the subject of a book entitled "Masquerade" written by Kit Williams and published in 1979.

It subsequently became the object of an international treasure hunt undertaken by readers.

For "Masquerade" contained all the clues to find the hare which had been sealed in an earthenware jar and buried in a secret location by the author, and television personality Bamber Gascoigne.

A man called Ken Thomas finally solved all the clues and dug it up in 1982.

When buried, it was valued at £5,000. Three years later, when unearthed, its estimated worth had soared to more than £20,000.

Earlier this year, the precious item was bought by Haresoft Ltd to launch a world-wide competition, with the hare as the prize.

A team of six programmers and two graphic designers has spent three months producing a find-the-treasure program, which they claim is not a game but a mind-bending puzzle.

To give an equal chance to youngsters who cannot travel freely, the hare has not been buried this time. All the winner will have to do is solve the clues contained in the program to pinpoint its location.

Haresoft has produced the program for the BBC Micro in two parts, each costing £8.95. They will be released three months apart.

The first tape – Hareraiser Prelude – became available in the middle of June, with part two – Hareraiser Finale – due in mid-September.

Both will be needed to find the location of the treasure.

To scupper the pirates, the tapes include information that the average computer owner will not be able to reproduce. Should copies be taken, the user will not be aware that all the data is not present.

As a secondary precaution, each tape has its own registration card which the purchaser must complete.

Haresoft is to offer £30,000 in cash as an alternative to the "Jewelled Hare" treasure.

THE fifth in the series of Electron and BBC Micro User Shows, to be held in Manchester from August 31 to September 2, is already reported to be a runaway success.

As early as the end of June virtually all the 90 stands available in the Renold Building at UMIST had been snapped up.

Acorn itself has booked an island of eight stands for its official display during the three day spectacular.

On your beam ends?

ARCHITECTS, engineers and surveyors faced with the chore of working out what size beams to use in building work can now sit back and let the BBC Micro do the worrying.

Software house Beamscan has upgraded its program for calculating steel beam sizes, which was previously on the Sinclair Spectrum.

Now it runs on the BBC Micro, and works out timber beam sizes, too.

Screen prompts ask the user for details of the loads. Then the micro recommends a choice of steel or timber beams, complete with appropriate diagrams.

Cantilevers are not covered by the program – only simply supported single-span beams.

However this caters for most of the calculations required in everyday planning permission applications.

The program costs £40.

10
Machine code graphics routines for the BBC MICRO A&B, ELECTRON
McVid
McVid
500

BBC and Electron users who like to write video games and design graphics can now have a set of off the shelf subroutines in machine code.

The collection of routines, called McVid, was written by Jim Gray of the software house Pro-supply.

The package comes on disc or cassette with a manual giving a fully commented source listing.

You still need a fair knowledge of machine code to use the routines or to modify them for your own purposes.

Coming soon from the same firm is an Adventurers Toolkit – a text compressor and mini text editor for machine code programmers writing adventure games.

Little Beasty lurks behind the monster

Elstree horror in the making

IT seems that behind every self respecting bloodthirsty monster these days there's a little Beasty.

In fact a new science fiction horror film currently being shot in top secret at EMI Elstree studios is relying heavily on a cast of Beasties.

However these Beasties will not be seen crawling all over the screen. For they are to be found inside the monster which has been created to keep cinemagoers on the edge of their seats.

The truth of the matter is that the Beasty is the trade name for a range of computer robotic slave devices for the BBC Micro marketed by Commotion of Enfield.

And in this case they are being used as part of the mechanical guts of a ghoulish film creature.

Nine Beasty servos have been implanted in the skull of the monster enabling its head to turn, lips to move, eyeballs to swivel – and even eyelids to flutter menacingly.

"It's all pretty gruesome", admits Tim Coote of Commotion, "for eventually the monster's blood and guts flow all over the place and its head explodes.

"Obviously just good family entertainment".

The Beasty range of products is in considerable demand by British film makers. Some of the family are now being used to help man-made reindeer drag Dudley Moore around another Elstree set.

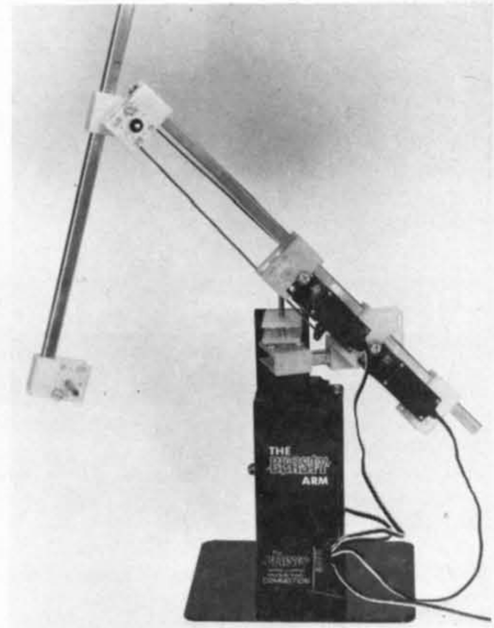
Special effects people have had a strong affection for the Beasty ever since it helped K9 trundle along behind Dr Who in the television series.

However its appeal is not limited to the film and television set.

In fact Commotion has been doing a roaring trade in the robotic slave devices for users of the BBC Micro. For, as the company's advertisements claim, they can unlock the power of the computer and allow it to do the donkeywork.

A Beasty, with up to four servos, allows the computer to manipulate a variety of objects from pushing buttons to controlling the environment of a greenhouse.

The company also offers a robotic building system which can be used to create the Beasty arm.



Power behind the shivers

Alfreds line up

ENGINEER Alan Green is all set to break into the world of robotics with a little help from his friends – robots Afred 1, Alfred 2 and Alfred 3.

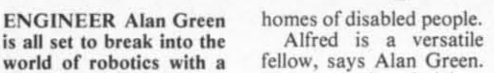
And it's all due to Alan's six year old daughter, Ann.

Fascinated by the robots, she asked her father to bring one to school. So he brought along Alfred – so called as a short version of "Alan's friend" – to show how robots can help in schools, industry and the homes of disabled people.

Alfred is a versatile fellow, says Alan Green. He can teach technicians to maintain and program industrial robots as well as help out in schools.

Afred 1, which appeared on TV earlier this year, costs £160 and can also be supplied as a kit for schools at £120.

Mobile, vision and voice controlled expansion modules will be available later this year, plus a 3D interacting graphics package.



A RANGE of educational robots designed as an introduction to cybernetics has been launched by Powertran Cybernetics.

Each can be reprogrammed and physically modified for various projects. The two large robots have RS232C interfaces for connection to a BBC or other suitable micro.

The small ones are designed to work with the ZX81, but can be adapted for the BBC Micro.

Prices for the kits range from £95 to £1,476.

Robotic aid for training

A NEW robotics device called the Micro Pulse Youngtrainer has been announced by Northern Computers. It connects to the BBC Micro and comes with a training course covering software and overlays.

These allow it to simulate traffic lights, house lights, a burglar alarm, a washing machine and other control situations.

The accessory kit contains an electric motor driven and controlled by the device itself.

Gareth Littler of Northern Computers says: "This is the first stage of robotics.

"It provides a teaching course that meets the requirements of computer studies and control technology courses for third, fourth and fifth year secondary school pupils".

DISK FILE

The Best Thing Next To Your Disk Drive

Proper care of your diskettes is essential to the well-being of your disk drives.

Dirt or grit on the diskette might wreck an important file and could mean expensive damage to the drive itself.

Storing your diskettes in a Personal Disk File protects them and creates an accessible and well organised library system too.

Each wallet is made from a strong but flexible vinyl to protect your valuable data with an individual index card with spaces for format, files and your disk to disk back-up record.

A special easel mechanism enables the Personal Disk File to stand for convenient access and the beige covers match the BBC.

The Personal Disk File comes complete with 10 inserts to hold 20 disks and their index cards.

Don't take chances, store your diskettes the right way now!

Direct by return of post from SOFTEACH or from good computer stores.

To **SOFTEACH LIMITED**, 25 College Road, Reading,
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Please send me:

________ **Personal Disk Files** Complete with 10 inserts and 20 index cards at £9.95 plus £1.35 post & packing, total £11.30 each

________ **Refill Kits** Of 20 index cards at £1.95 each inclusive.

(Overseas should add 25% for additional surface mail)

I enclose a total remittance of £________ cheque/postal order payable to SOFTEACH LIMITED.

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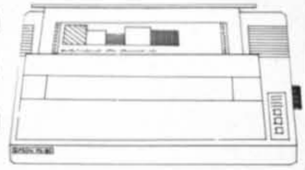
COMPUTER CENTRE

EPSON PRINTERS



RX80	**£239.95**
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The superb range of Epson printers are even better value than ever at these super new low prices.

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COSMOS 80

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*** * £199.95 * ***

Specification is the same as the Shinwa.

PACE DISK DRIVES

The extensive range of Pace disk drives are fully compatible with the double density op. systems which are now becoming available.

With Wildings super low prices and a drive to suit every purpose you need look no further.

PSD1 (100K single) 40T	£169.95	PDD1 (200K double) 40T	£334.95
PSD2 (200K single) 40T	£239.95	PDD2 (400K double) 40T	£469.95
PSD3 (400K single) 40/80T	£279.95	PDD3 (800K double) 40/80T	£555.95
PSD4 (400K single) 80T	£244.95	PDD4 (800K double) 80T	£479.95
PSD5 (200K single) 40/80T	£254.95	PDD5 (400K double) 40/80T	£499.95

All drives include formatting disk and manual.

Various disk operating systems in stock. Please phone or call for details.

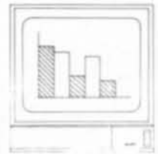
MONITORS

MICROVITEC

14" Cub colour monitor inc. VAT **£219.95**

14" Cub colour monitor with sound facility inc. VAT **£239.95**

SANYO CD3125N



14" colour monitor inc. leads for connection to the BBC Micro. Few only at

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Chance to hear Mr Music

THE doyen of the British electronic music scene, Mike Beecher, will be making guest appearances on the City Music stand during the July Electron BBC Micro User Show.

A former editor of *Electronics and Music Maker*, he is now head of Electron Music Research, the company responsible for the BBC Midi interface.

This device allows the BBC Micro to communicate directly with a range of synthesisers, digital rhythm units and sequencers. The machine's memory can be used to store up to six separate tracks of music.

End of the line for Model A

ACORN is to discontinue sales of BBC Micro Model A from September.

Though cheaper than the Model B, the Model A offers a smaller memory and fewer features.

As a result, it has accounted for only 13 per cent of the company's total sales of more than 350,000 machines since it was launched in 1982.

Orders for the Model A will be honoured up to August 31.

"We are to concentrate wholly on Model B production", an Acorn spokesman told *The Micro User*.

Bug board

THE Swedish BBC User Group "Bug", formed last October, has set up a bulletin board devoted entirely to the BBC Micro.

Bug secretary Anders Wickman says English BBC users with modems are welcome to call the new service. The number to call from the UK is 01-046 8-46 35 28.

Micro Olympics goes on TV

MICRO Olympics, the best selling computer game from Database Publications, has been selected for a nationwide television quiz show to be screened later on in the year.

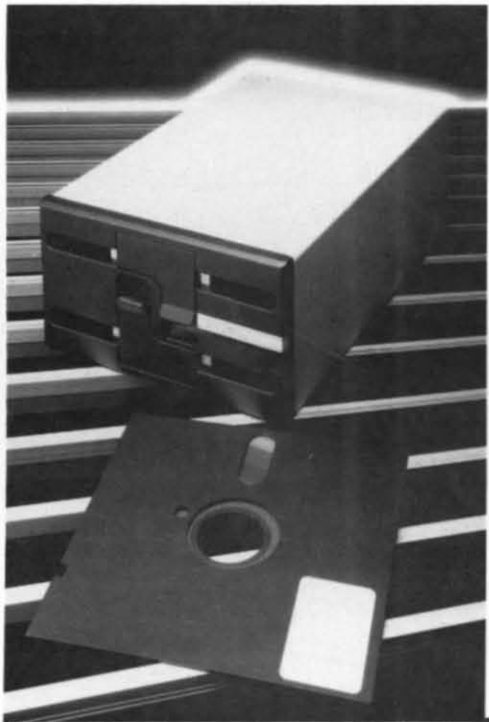
It is to be featured on "First Class", a new seven part series being produced by BBC Television in Glasgow.

Aimed at children of all ages, it is to take the form of a general knowledge quiz to reflect the tastes and skills of today's youngsters.

The BBC is currently sending out 190 test papers to schools all over Britain and from the replies will name the teams to take part.

"We want to use Micro Olympics because it is a first class game with a wide appeal for youngsters and adults alike – with real elements of skill involved", said producer Charles Nairn.

"First Class" is provisionally scheduled to go out early evening starting in November. The prize for the eventual winners will be a BBC Micro.



When it pays to be bossy

FRUSTRATED tycoons among *Micro User* readers will be glad to hear that the management simulation game "Manage" is now available for the BBC Micro.

You don't need any financial knowledge to play, but you do need to be bossy.

After casting yourself in the role of a powerful and decisive managing director, you can crush your opponents with a series of dazzling marketing ploys.

The idea is to build up cash and plant so that the opponent cannot compete.

The game is for two players or two teams, and can be used either for real management training – or just for fun.

Sales penetration is determined by price and marketing mix. Decisions are interactive with those of the opponent and the players' own resources.

For example, splashing out on sales promotion and cutting profit to boost sales turnover leaves the production side short of cash.

Quarterly management reports show the MD his stock level, profit and loss, cash flow, sales – and other essentials. All this combines to make a game that depends for success on skill rather than luck.

TWO-IN-ONE DRIVE

A DUAL floppy disc drive for the BBC Micro – completely designed and built in Britain – has been launched by Tech Op.

And it is claimed to be the cheapest around. "I haven't seen anything to touch our price", says Tech Op's Waldemar Osicki.

The secret lies in the design. A single motor drives both discs, and this cuts the amount of other hardware involved – thus making the unit cheaper.

"And it means there is less to go wrong", says Osicki.

The single-headed model costs £275 for a maximum capacity of 800k. The double-sided version at £349 gives a maximum of 1600k.

Pictured are the joint first prize winners from the William Howard School of Brampton, Cumbria and the Drayton Manor School of Hanwell, West London, with the managing director of BBC Television, Bill Cotton.

Software winners

A TEAM from the William Howard School, of Brampton, Cumbria, has won the BBC National Schools Software Competition with a program for the BBC Micro.

Simon Harris, 14, and David Eldridge, 15, won £4,000 worth of computer equipment for MU-Wise, a word and music processor.

They shared the top spot with Drayton Manor High School, London.

Third prize went to Bluecoat School, Oldham, for a technical drawing program.

All three schools had previously won £750 for coming first in their respective regions.

The awards were made on "Micro Live" on BBC TV.

A FULL LOGO FOR THE BBC MICRO

It's a four-turtle race!

LCSI
LCSI
LSL
ACORN
ACORN

Here's a puzzle for teachers and parents:

How will you choose between at least four different versions of LOGO for the BBC micro, all likely to appear over the next few months?

Should you pick the official Acorn version? How about the Open University's entry? What about the dark turtle from Logo Software Limited?

Insiders are backing the fourth runner in the BBC Logo stakes, LCSI Logo from Logotron Ltd. Its form is impressive and the price is right:

It must be the winner . . .

LCSI Logo for the BBC B will cost £59.95 (inc VAT). Clip the coupon and send it to Logotron with your name and address. This will . . .

- **secure your place in the queue for LCSI Logo, without any obligation on your part.** We will write to you with full information in September, as soon as LCSI Logo is ready for delivery
- **give you a £5 saving on the full price.** This will be taken into account when we ask you whether you want to confirm your order.

Logo Computer Systems Inc (LCSI) is a Canadian company whose entire business is dedicated to producing implementations of LOGO for microcomputers in schools and at home. None of its rivals has ever produced an implementation of Logo for public sale.

LCSI has produced implementations of Logo for Apple, the IBM PC, Atari, the Coleco Adam and the Sinclair Spectrum. Developed at MIT, it's the closest there is to an international standard for the language.

LCSI Logo for the BBC offers true animation, with programmable sprites, allowing planes to fly, turtles to swim, rabbits to hop, and dragons to breath smoke all over the screen. Written in assembly language, it's lightning fast.

LCSI Logo for the BBC, with all the features (and more) that have made the Atari Logo an instant hit, is contained in a single ROM chip. It is a full implementation of the language (true list processing) which works equally well with cassette or disk.

If you want to go to the head of the queue and enjoy a 20% saving on the launch price, send £47.74 (includes £6.14 VAT). You will receive your LOGO with full LCSI documentation in September in time for the autumn term.

To **Logotron Ltd,**
Dept MU1, 5 Granby Street, Loughborough, Leicestershire.

☐ Please send me LCSI Logo on ROM for the BBC B. I enclose £47.74, a saving of 20% on the launch price.

☐ Please reserve me a copy of LCSI Logo, and bill me at the launch price, less £5 (£54.05, inc £7.05 VAT).

☐ Please send details of the Logotron Sprite Board, giving 30 programmable sprites.

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EDUCATIONAL COMPUTING had this to say about Atari's LCSI Logo in May:

> '*After using . . . Logo for three months, I got hold of Atari's (LCSI) version.* **I felt like someone who had been eating stale bread believing it to be cake, suddenly tasting his first slice of Black Forest Gateau** . . . *Seymour Papert's concept of putting the power of the computer into the hands of children has changed from a slogan into a practical possibility* . . . **After only a couple of evenings of using Atari Logo, my five-year-old son had drawn a helicopter base and sent four different coloured helicopters into orbit around it** . . . *Atari Logo is the best implementation of the Language I have seen on a micro. It will be the version against which others are measured for some time.*'

Can you run the risk of getting stale bread? Post your coupon today and make sure of Black Forest Gateau on your BBC micro.

Graduate goes on show – at the big show

TORCH Computers has selected the July Electron and BBC Micro User Show as the launching pad for the Graduate – the first IBM compatible upgrade for the BBC Micro.

Recently bought out by Acorn, Torch has now acquired the exclusive manufacturing and worldwide sales rights for the extension system which was exclusively revealed in the June issue of *The Micro User*.

Designed by Data Technologies under a licensing arrangement with Acorn, it is an 8088 processor with 128k or 256k RAM and twin discs. It plugs directly into the BBC Micro.

Top of the Graduate range is the G 800/2 which carries a price tag of £999. It provides a 256k 8088, twin 320k disc drives, two hardware expansion slots, upgraded MS-DOS and a comprehensive user manual.

Cheapest model is the G400/1, a 128k single drive unit, which costs £764.

The complete range is to be sold through the Torch network of more than 200 dealers.

Commenting on his company's deal with DTL, Torch chairman Bob Gilkes said: "It will open the door to thousands of users who cannot afford the price of entry into the world of IBM-compatible software".

DTL chairman Martin Vlieland-Boddy, former chairman of Torch, added his official blessing to the recent agreement:

"It will allow DTL to concentrate on the design of new products, leaving Torch, as the established supplier of upgrades to the BBC, to provide the manufacturing and distribution muscle".

Colin Yeoman, Torch customer support manager, admitted that the BBC keyboard and display may pose some problems for total compatibility.

"Given the limitations", he added, "the Graduate achieves a very high level of PC compatibility, including running the two applications considered as touchstones – Lotus 1-2-3 and Microsoft's Flight Simulator".

Torch expects first customer deliveries this month, but warns that component shortages may well result in delivery taking more than 28 days.

Logic analysis for the smaller firm

TEACHERS, engineers and designers on low budgets can now have logic analysis equipment at around a quarter of the usual cost.

Lawrie T & M of Otley, Yorks, have designed a system round the Zicon 701 forty channel data and signature anslyser.

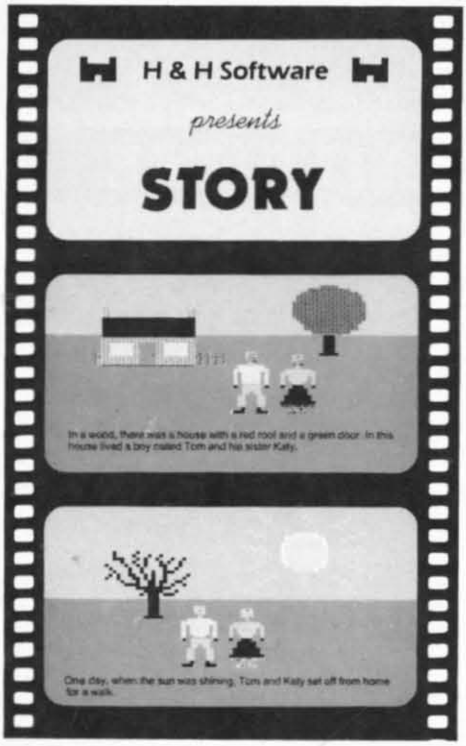
Software and hardware link it to a BBC Micro which translates captured data into relative timing diagrams.

"Purpose built systems can cost £8,000 or more", says sales manager Ron Short. "This way small firms can have a perfectly good system much cheaper, because they can use bits and pieces they already have".

Features of the system include disassembly, data storage and retrieval using disc or tape, single or dual monitors, listing and signature dump to printer.

The timing display has expansion, movable cursors and auto readout of time between cursors and trigger. There is keyboard entry of labels.

Any 16 of the 40 channels can be displayed in any order. Maximum clock rate is 10 MHz.



H & H Software

presents

STORY

In a wood, there was a house with a red roof and a green door. In this house lived a boy called Tom and his sister Katy.

One day, when the sun was shining, Tom and Katy set off from home for a walk.

Micro can aid tiny authors

"ONCE upon a time . . . " was how they used to write children's stories. Now it's all done with a BBC Micro.

A Cheshire software house has come up with a game which allows children to produce their own illustrated stories.

There is a bank of pictures to call up for the illustrations, but children can modify these – or even make up their own drawings.

Each screen consists of a picture and up to seven lines of text. The completed story can be produced, saved and a hard copy produced.

The printed-out story is a bonus for small children, who may never have seen a neat copy of their own work before.

The package, called Story, comes with a 16-page manual in two parts – one for beginners and one for experts. It is available from H & H Software.

Gore not to the fore

MUST adventure games be gory? Must you slay, maim, drug and blind all in the name of fun?

"No", say the members of the Association of Teachers of Mathematics and to prove their point they've just brought out a non-violent game called "L".

It's a mystery adventure, and one of the mysteries is its title. It includes complex geography, scenes full of clues, and valuable items to hunt, collect and use.

But there's none of the usual skull-cleaving violence. Instead, brains are to the fore, not to mention pen, paper and calculator.

"L" is available on disc for £10.

CHIP EXPANDS BASIC

BBC Basic can now be expanded by another 40 commands with an 8k eprom called Addcomm from Vine Micros. It gives a cross-section of adaptable statements that does away with the need to buy separate chips, and provides graphics commands, toolkit commands, logo graphics and general utilities.

Nazir keeps his secret

THAT enthusiastic inventor of add-ons for the BBC Micro, Nazir Jessa, was uncharacteristically reticent when tackled about rumours that he was planning to unveil his biggest surprise yet at the July Electron & BBC Micro User Show.

"It's my best-kept secret, and it will be until the show opens", he said. "We've been working on it for many months, and I can tell you it's absolutely fantastic".

Nazir is the head of Watford Electronics, which brought out the first paged ROM/RAM board a year ago. Apart from admitting that it was a hardware product, he wouldn't be drawn on whether the new development was in the same area.

But he added: "No one ever thought it could be done, but we have done it. People won't believe it until they actually see it.

"I'm sure it's going to draw a lot of crowds".

£80 incentive to buy a Beeb

WHILE prices of rival computers have been dropping steadily, Acorn has always insisted that demand for the BBC Micro was such that there was no intention of selling it for less than the £399 which it has cost since it was launched in 1982.

But that is just what the firm has done – in a rather roundabout way – with its current summer promotion.

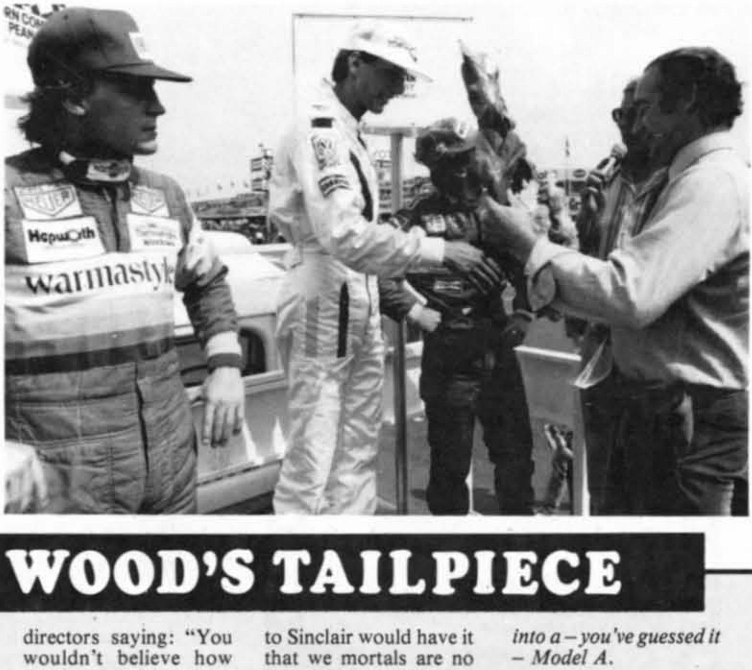
Every purchaser of a BBC Micro has now been offered a starter pack worth more than £80. You can choose between a free cassette recorder and five "entertaining and absorbing" software programs, or, if you already have a recorder, eight programs and a cassette lead.

You will note, however, that none of the current Acornsoft programs are included in the entertaining and absorbing software they offer.

Acorn denied that its special offer was thinly disguised price cutting.

"The fact of the matter is that July is traditionally a quiet month in the industry, so to even things up a bit, we decided on this incentive", said a spokesman.

"In that way, we hope to increase sales to our usual average of around 20,000 machines a month".



ACORN'S ACE

ACORN managing director Chris Curry presents the prizes to the winners of the Acorn Computer European Trophy, the main race during Acorn's raceday at Silverstone.

Receiving the garland is winner Johnny Dumfries with second place man, Russell Spence, nearest the camera, and Ivan Capelli who was third, far right.

Dumfries' victory put him into the lead of the FIA European Formula Three championship.

BARRY WOOD'S TAILPIECE

ANYONE see those amazing revelations in Squirrel Abuser's Diary? What a staggering feat of investigative journalism!

No doubt their next discovery will be that Prince Charles is friendly with someone called Diana . . .

* * *

YOU got to hand it to the old Abuser, though. He/she/it has fearlessly revealed that Acorn has managed to break another firm's software protection.

Good on you Acorn, we always knew you could do it!

* * *

TALK about nature imitating art . . . As I was making my contribution to the bartender's fund at a recent show I heard one of A&F's directors saying: "You wouldn't believe how much an ad on page three of the Sun costs".

* * *

SO far this month – much to his delight – our beloved editor has received a pound of mushrooms (from Mushroom Computers) and a stuffed animal promoting Mirrorsoft's Caesar the Cat.

At this very moment he's leafing through the adverts in this month's mag wondering where his next bit of booty will come from.

Personally I hope it's from either Alligata or First Byte.

* * *

DID anybody catch his holiness Clive Sinclair pontificating about the state of things?

The gospel according to Sinclair would have it that we mortals are no more than machines – without a soul.

Odd coincidence that – that's how I've always described the Spectrum . . .

* * *

TALKING about odd micros, have you noticed the plethora of add-ons for the Beeb? Multitudes of Z80 processors, 6502 processors, 6809 processors, turn-your - Beeb - into - an-Apple cards, turn-it-into-an-IBM . . . the poor thing must be positively schizophrenic.

I can reveal that Acorn is determined to maintain its market lead.

Following the disappearance of the Model A, it is said that Acorn are going to produce an add-on to turn your BBC Micro Model B into a – you've guessed it – Model A.

* * *

I'VE always been wary of sub-atomic particle physics. I mean, that's how they make those nasty bombs and things.

Mind you, now I realise why they do it. If it weren't for their research, how else would we get names for new micros?

* * *

WHILE we're on the subject of describing things – words fail me when it comes to our blessed editor.

He's just got his Z80 second processor and he's nauseating.

"Oh, should I do it on my Z80 or my 6502? Those sweet Acorn boys are so prolific", he simpers every time he goes near his micro.

He got his comeuppance at our local user group, though. It was his giggled: "Oh, do you still have to download?", that did it.

He barely got out of there with his first processor intact, never mind his second.

* * *

HE'S even started giving courses on the Beeb now – and I haven't missed one. They give a whole new slant on the machine.

Take his latest pearl: "Here's how you find out where the top of memory is".

On his monitor appeared the magnificent:

PRINT "HIMEM"

* * *

MIND you, he was the chap who sent his disc drive back because it only formatted 27 tracks . . .

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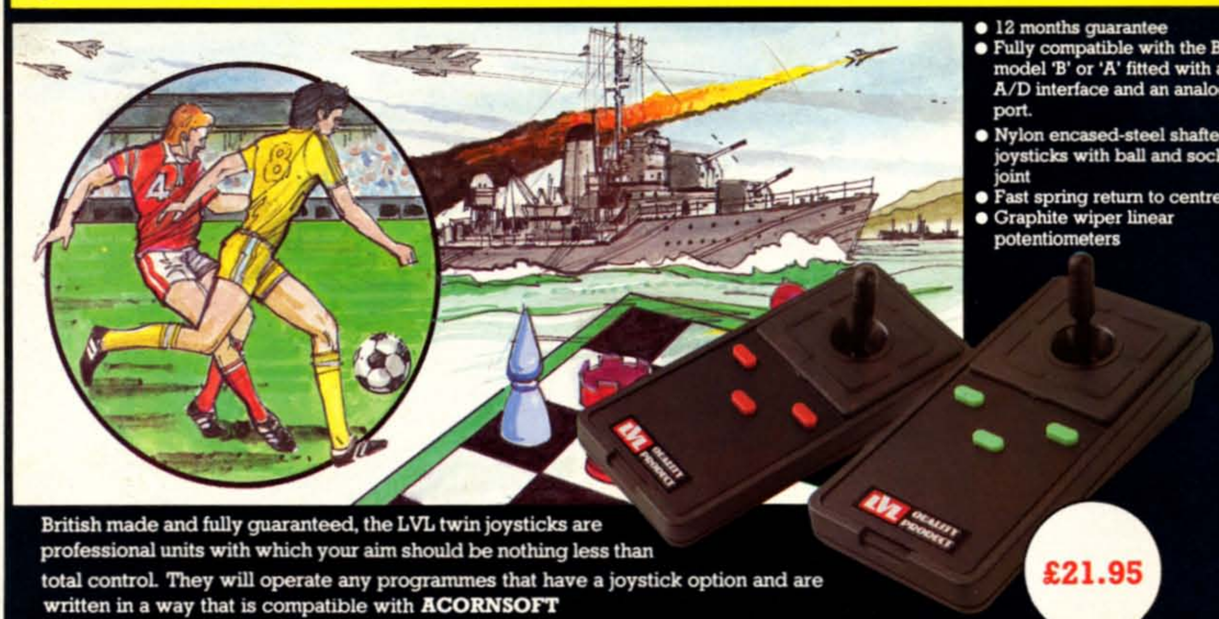

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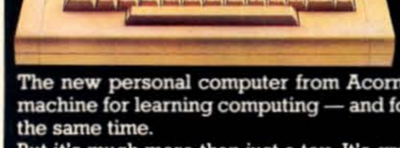

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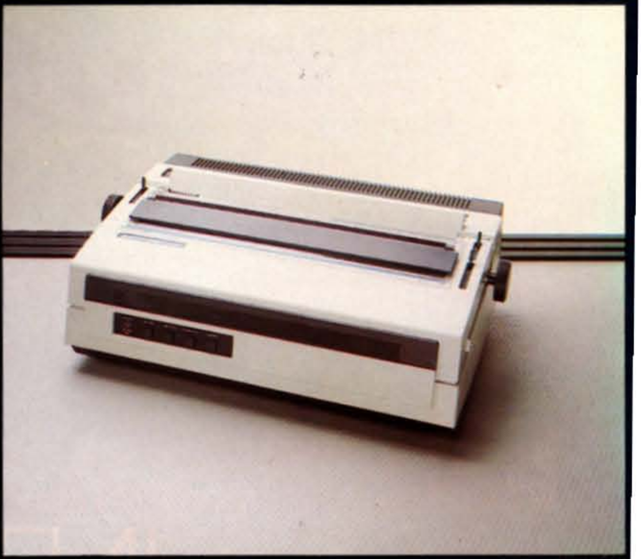

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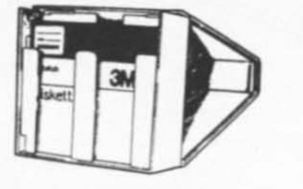

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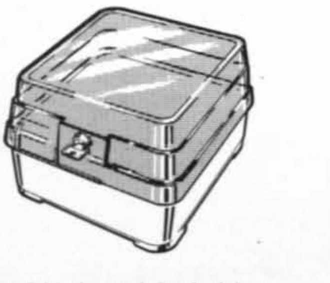

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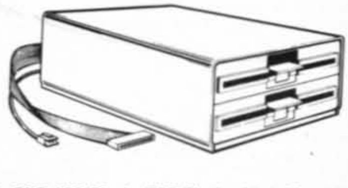

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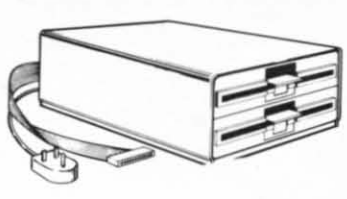

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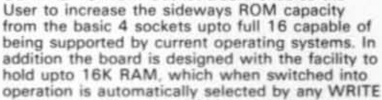

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★ **It works in modes 0, 1, 2, 4, using full colour.**
★ Simply use Ctrl–V to select the font and all further screen output will be in a new style.
★ Even the ordinary Beeb character set can be enhanced by doubling height or width and emphasising to give bold print.
★ A comprehensive editor is included which enables the user to design his own characters.
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★ This really must be one of the most original and exciting products of the year.
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"Makes Printing Childs Play"

Are you fed up with not being able to unravel your printer manual and use all those features you paid for? Need sensible paging for use in the creation of booklets? Then you certainly need our Beeb Printer ROM.

A machine code printer utility in ROM.

- 'Single' key operations replace control code sequences for underline, font and size selection, paper movement, etc. Up to 30 come pre-defined, without effecting normal fn key usage.
- **This rom allows easy control of your printer from 'Within' WORDWISE text. Instead of long escape sequences, you just 'OC' a single number to Select, Underline, Print Styles, etc.**
- Automatic fanfold page margins. Puts gaps in listings. PRINTed text etc to skip the folds. The gap size alternates to minimise paper wastage when using binders.
- Form feed and related commands, made available on ALL printers. Can also provide a left margin.
- User defined characters embedded within text are printed as on VDU.
- ★ Commands select option for GP100, STAR, NEC, MX/FX, LP VII/DMP100, DMP200. Operates with Parallel and Serial Printers.
- Fully functional with the popular WORDWISE wordprocessor.

Supplied complete with a comprehensive 50 page manual.

Price: £24

(When ordering, please specify printer type)

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A highly sophisticated machine code ROM providing screen to printer dumps in any mode, plus window setting utilities and two new OSWORD calls that allow you to use the Beeb graphic coordinate system for plotting or testing mode 7 'pixels'.

*GIMAGE Ultra sophisticated dump of any graphic screen, using up to 8 tones. Handles **FULL MODE 7 text,** graphics, double-height and colour and mode 8. 14 optional parameters, using 'prefixing' so that you only need specify the ones that you want. The parameters include:

- V<scale>, H<scale>. These are both 2 byte numbers giving you very fine control over the dump size from minute to enormous. Unlike other dump Roms, scale does not vary with screen mode.
- R <0-3> Dump rotation 0, 90, 180, 270 degrees.
- I<indent> Set gap from left edge of paper.
- X <min> <max>, Y <min> <max>. The area of the screen dumped is that in the graphics window, alternatively these parameters may be given.
- P Physical colour values used for dumping. (Otherwise use a negative scale, i.e. white prints darkest.)
- T Two tone dumps for higher resolution.
- M <mask> 8 bits controlling colour masking.
- E Contrast expansion. Makes mode 7 text characters and separated graphics stand out more clearly from the background.
- C All mode 7 graphics printed as reduced size dumps.
- *GWINDOW Draws graphic window on screen, its size and position can then be altered using the cursor keys.
- *TIMAGE <indent> Does a fast, text only dump of the text window in any mode.
- *TWINDOW As GWINDOW but for text.

DUMP OUT 3 gives you ALL of the GIMAGE facilities listed above and GWINDOW in mode 7 as well, not just hi-res modes.

Ideal for CP80, GP80, DP100, GP250, STAR, KAGA/TAXAN, NEC, SHINWA, CP80, GEMINI, EPSON MX/RX/FX, LPVII, DMP100/120/200/400 Printers.

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MODEM 84

APPROVED for use
with teleco[illegible]on systems
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in accorda[illegible]e conditions
in the instructions for use.

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With the launch of Watford's MODEM 84 you can now hook into PRESTEL, MICRONET, HOMELINK, TELECOM GOLD, etc., for about the cost of a good tape recorder. Prestel gives you access to an incomparable database covering almost every subject under the Sun. There is Micronet with lots of free programs that you can download and run. Details of Clubs and User groups, a diary of meetings and exhibitions, news and reviews, technical information, etc. There is Homelink with On-line banking. And there is armchair shopping, travel information, Entertainment, World News, Sports News, Business News, Weather information, Electronic mail and lots more. The basic Prestel subscription is only £5 per quarter for domestic user and at off-peak times there is no charge for access time. Can you afford not to be part of this revolution?

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Compare the Specifications:

MODEM

- Direct-connect Modem using BT approved isolation components.
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- Simple single button operation and comprehensive LED status display.
- Attractively finished. Sized to sit on the Disc drive.

NEW SUPER PRESTEL INTERFACE ROM

Fully compatible with Watford's MODEM 84 as well as with PRISM and most other Modems.

- Supports full Prestel Colour Alpha and Graphic Characters including Double Height, Flashing, Conceal/Reveal.
- Called by simple *PRESTEL command. Disc and Tape configurations fully supported.
- Telesoftware downloader included.
- Comprehensive MAILBOX facilities including offline editor.
- Auto Logon sequence, can be burnt into ROM if desired.
- Unique "TAG" facility allows tagging and recall of interesting pages – avoids the common and annoying 'NOW WHERE WAS THAT PAGE' problem.
- Page load and save to tape or disc. Pages are automatically saved under Page Number reference in a 'FRAME' directory.
- Print page options are ASCII only (i.e. with supression of Graphics) – fast and works with any printer – as well as a full graphics dump for the popular Epson printer.
- 'USER' function call built into interface with specialist add-on routines (your own as well as ours).
- All the above facilities available from Function Keys. An overlay is provided giving simple yet comprehensive guidance to the key functions.
- Comprehensive instruction manual supplied.

PRICES:

SOFTWARE ROM incl. Comprehensive Manual **£20**

MODEM 84 (without software) **£62**

MODEM 84, SOFTWARE ROM and Operating Manuals **ONLY: £75** (£2 carr.)

(Please allow upto 28 days for delivery)

Please write to Watford Electronics for full details, Order and Application Forms.

NEW FX80 PRINTER DRIVER for VIEW

Do you want to use Italics or Enlarged Characters with View? French or German Characters? These and other FONTS from FX80 character sets can be accessed using our Printer Driver with VIEW. The disc contains an example as well shows how to use. Available on 40 or 80 track Disc. **ONLY: £7.50**

EPSON DUMP ROM

A specially designed Dump ROM for EPSON RX, FX and the new Kaga KP810 Printers. Will accurately DUMP all Screen modes including TELETEXT, GRAPHICS and DOUBLE HEIGHT. MULTITONE DUMPS are also supported. Simple single command (*SCDUMP) operation.

Only: £16

TINY PASCAL for BBC Micro **£59**

VIEW

Wordprocessor (New version) **£52**

FORTH ROM for BBC

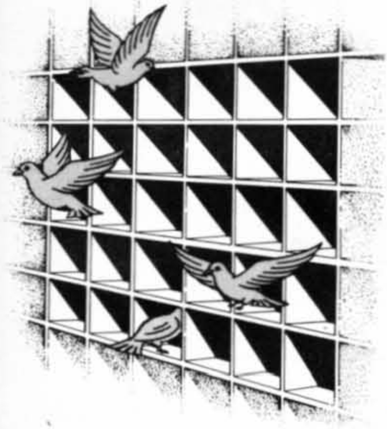
This superb (FIG FORTH) compiling language now available in ROM. Simply plugs into one of the ROM Sockets. Manual included. **£33**

WATFORD ELECTRONICS

Continued ⟶

WONDERFUL WATFORD

TWO DATABASE SOFTWARE for BBC MICRO



DISCDATA

At last for BBC Micro Disc users, Watford Electronics have produced 'DISCDATA' which must be the most versatile general database at the price on the market. The length of your files is restricted only by the space on your disc. You can have upto 20 fields with 'page' length records of upto 254 characters. The program is completely menu driven obviating reference to a manual although written guidance is given with the program. Add and delete records, amend title, field names and records, sort on any field and search for any record or group of records in any field. You do not need to abandon or rewrite your files if you wish to add additional fields or extend the length of any field, the program will rewrite the files for you. Your files can be in any drive. Output can be in 40, 80 or 132 character width with Printer routines. Two forms of output are provided for horizontal for label type output and a tabulated output with title and headings. What is more, the selected fields can be placed in any order on the screen. In the horizontal mode you can scan backwards or forwards with wrap around effect. Output can be started or stopped anywhere in the file. There is automatic totalling on decimal fields and an automatic count of the number of records output.
Now with extra 3 features: Allows string search; Calculations can be done on numeric fields; Create Sub-Files from the main File.

On disc at **Only £15**

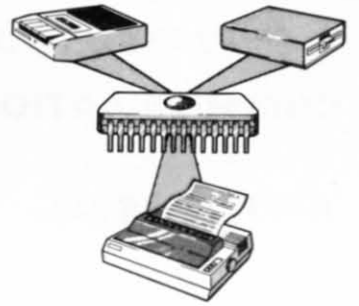
It has to be the best value.

FILE-PLUS

Now even more powerful with the added facility of a SHELL SORT on any field. This must make DATA-PLUS the most powerful and versatile Database to be found on BBC Micro.
A 16K ROM containing the most flexible and easy to use disk based Database system on the market. A database may occupy your total on-line storage capacity. You may design any number of data entry forms using a "paint" on screen technique. Forms may be upto 3 screens in size. A form may be used to Add, Delete, Update, Print and Spool records from your Database. Quick search facility on any text field. A query language provides full maths support (–, +, /, *, +–9999999999.9999) and compare facilities (=, >, <>, <=, >=, &, I) when used with the keywords – Assign, Compare, Display, End, Goto, Iff, Ift, Print, Read, Search, Spool and Update. Full printed output control via embeded commands. Supplied with 70 page manual and fitting instructions.

Only £43

BUFFER & BACKUP ROM



A very versatile firmware. An ideal ROM for engineers, programmers, teachers, students, etc.

★ Converts your Sideways RAM to a 4K or 16K BUFFER for a parallel printer. (Uses * FX5,3). (You no longer require to purchase expensive (£100+) Printer Buffers.)

★ Dumps selection of Disc files to Tape.

★ Makes backup copies of tapes onto Tape, Disc and Hobbit.

★ Displays contents of a chosen paged ROM on screen.

★ Menu display on 'shift-break' using ROM Filing System.

★ Comprehensive Manual

Simply a give away at **£18**

GEMINI'S BUSINESS SOFTWARE

Cashbook Accounts	£52
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Invoices & Statements	£17.25
Commercial Accounts	£17.25
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Home Accounts	£17.25
Beebcalc Spreadsheet Analysis	£17.25
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Payroll	£39

N.B. All the above Gemini software is on tape. For Disc Based (40/80 track) please add £3.

VERSATILE LIGHT PEN SOFTWARE

- Enjoy, Explore, Educate!
- Pixil, Line, Character Definition
- Free hand drawing
- All Colours – MANY Special Effects
- Fill, Refill and Stripes
- User defined "Brushed Strokes" plus Character definer
- Grid, Scale, Perspective aids
- 2 TO 200 Points palletable in one Design with Circles and "RUBBER BANDING"
- Move design/character to any screen position
- Save and Load screens, User defined Graphics and line drawings for video titles, Own programmes, etc.
- Many Educational uses
- Instruction booklet included
- Full software support for "CUSTOM USE"
- Works with Watford, RH, Acorn User, DIY, and many other LIGHT PENS
- Available on DISC or TAPE

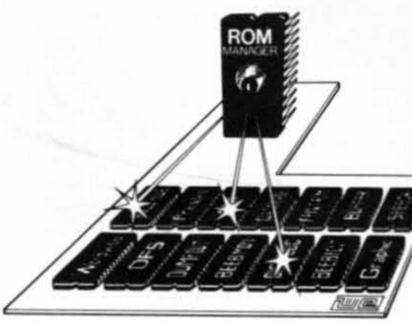
Price: Tape **£10;** Disc **£11**

DISC EXECUTOR

Disc Executor is a highly sophisticated disc utility which allows you to transfer all tape based software that we know of onto disc. You no longer have to throw away any of your cassette based software on acquiring a disc drive. It handles 'locked' programs and allows you to load full length adventure type programs (i.e. up to & 6E blocks) and programs that load below &E00. It is very simple to operate (full instructions supplied). It saves you your valuable time and money too. Our Disc executor is not a Replica, its the 'Real Thing'.
Available in both 40 and 80 track discs. Please specify when ordering.

Price: **£10**

ROM MANAGER



This unique piece of firmware has been designed to allow the USER to access the BBC Micro's Sideways Rom Paging facility to the full. The 18 Commands our ROM MANAGER adds to your computer are concerned with 3 aspects of ROM use:

1. ROM CONTROL – Ability to activate at random any of the ROMs present in the Micro.
2. BBC MICRO's STATUS – e.g. Checksum on any ROM, and the Filing system currently active.
3. ROM DEVELOPMENT – Allows main memory to be used like Sideways RAM.
The Commands available are:
***CHECKSUM** – generates a CRC for the specified ROM.
***DIRECT** – allows you to pass a particular command to the specified ROM.
***EXAMINE** – allows examination of the named ROM.
***EXPLAIN** – gives detailed description of the first 22 FX codes.
***FILE** – passes the command directly to the currently selected filing system.
***FUNCTION** – displays the string currently programmed onto the function keys.
***INCLUDE** – allows he main memory to be used for developing ROM software without need to purchase expensive sideways RAM.
***MODIFY** – any location in memory is displayed and can be modified with this command.
***NAMES** – displays the names of any resident ROMs.
***RAM** – allows the command to be passed directly to the 'RAM based ROM'.
***REMOVE** – turns off the 'RAM based ROM' option.
***SPECIFY and *DEFAULT** – specifies the default ROM and passes the named command to the default ROM specified.
***STOP and *START** – allows the named ROM to be disabled or enabled, preventing clashes between ROMs.
***STATUS** – provides information about the ROMs inside the BBC micro, including the socket number, the name of the ROM, its length, whether or not it is enabled and supports language or service entry points.
***VALUES** – outputs information concerning the status of ROM MANAGER e.g. the socket number it occupies, the number of active ROMs with a higher priority than itself, the current filing system.
***VECTOR** – the same function as *DIRECT, but provided in case *DIRECT clashes with other ROMs.
In our opinion this ROM is one of the most useful utility ROMs available on the market, and is a must for anyone using ROM based software.

Introductory Price: Only **£19**

ADE

The complete program development package on 16K ROM. A must for all the Assembly Language Programmers.

Introductory price: **Only: £52**

ACCESS HOT LINE

Tel: 0923 50234

BEEB MON

INX
YI
CMP
PASS

Watford's own Machine code Monitor ROM written by Andrew Bray (Cambridge), co-author of the BBC Micro Advance User Guide.

The most powerful and versatile machine code monitor ROM yet written for BBC Micro. It has all the normal memory editing, moving and relocating facilities, plus all editing is with a full screen editor allowing scrolling up and down memory, entering in Hex, ASCII or standard assembler mnemonics.
In use as a debugging tool, you run code under a total emulation system. Everfelt a desperate urge to set a break point in ROM? No problem – you can even have breakpoint on reading or writing locations in memory and on register contents. The system fully supports debugging of sideways ROMs e.g. BASIC can fully and easily be run from within Beebmon and from there DFS and other sideways ROMs can be used in total emulation mode.
Beebmon can even run itself. In so doing you can nest Beebmon up to a level limited only by the memory size. Beebmon uses 256 bytes of workspace, located anywhere in memory, even on the 1MHz Bus. Beebmon effectively uses no zero page workspace, so your program (e.g. BASIC) can use any or all of the base page. How does it achieve this? By providing a 6502 interpreter all programs running under it exist in a vertual BBC, so special memory locations like the ROM latch are not actually accessed by your programs, instead they alter a location in Beebmon's workspace. Emulation also allows immediate return to Beebmon command level by ctrl-escape no matter what code is being excuted at the time. All this exceptional power and flexibility is complemented by a clear and detailed manual included in a value for money price of:

£22

Disassembler Rom

N . 3 8 D / 4 M / O
6 0 - H 1 S U G . 7 $
. + £ 5 E
P 1 % V Z
A Z T

```
D350 18          .   CLC
D351 A5 D6       ..  LDA D6
D353 6D 52 03 mR.  ADC 0352
D356 85 D6       ..  STA D6
D358 A5 D7       ..  LDA D7
D35A 6D 53 03 mS.  ADC 0353
D35D 10 04       ..  BPL D363
D35F 38          8   SEC
D367 6C 5D 03 l].  JMP (035D)
D36A 46 D1       F.  LSR D1
```

Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use programmers tool.
A ROM based machine code Disassembler for the BBC micro. It enables machine code programs to be listed in BASIC/DUMP format and thus is the perfect complement to the built in assembler. It allows Sideways ROMs, files on disk or tape to be listed, and also has a comprehensive editor, allowing mnemonics to be altered directly, as well as HEX, DECIMAL, ASCII and BINARY memory editing. There is also a full set of labelling facilities available (up to 3,200 labels), with the major locations and routines already labelled.
Thus DIS-ASM enables any monitor program, such as BEEBMON to be used to much greater effect as it is not necessary to disassemble memory each time the display is altered.

ONLY **£16**

(Price includes a comprehensive manual and fitting instructions.)

COMPUTER CONCEPT'S ROMS

Graphics ROM	**£28**
Basic Utility ROM	**£28**

DISC DOCTOR

A sophisticated Disc Utility ROM with many useful commands. (For detail description please refer to Computer Concept's advert in this magazine.)

£27

Wordwise

Without doubt a very sophisticated piece of software for the BBC Micro. It has all the features of a professional word processor yet is easy to use.

SPECIAL OFFER THIS MONTH: **£32**

THE INVESTIGATOR

Now you can make up back-up copies of all your Discs. Put the precious originals away in the safe and use your duplicates.
See what your 8271 can do! With Watford's Investigator you can find out about track formatting, sector length, etc. Investigate your disc and then make up your back-up copy.
Disc based software includes a comprehensive manual.

Price: **£15**

(Please specify 40 or 80 track when ordering)

CRAWLER

A new challenge for your reflexes, exercise for your fingers. Crawler is the best yet BBC version of the popular arcade game "CENTIPEDE". Blast the voracious caterpillar before it eats you. Avoid the wandering spiders. Shoot the scorpions before they poison the mushrooms. Kill the descending fleas as they cause massive mushroom growth. This game is a delight to play. The controls are responsive and fast yet precise.

Only **£5**

LIGHT PEN

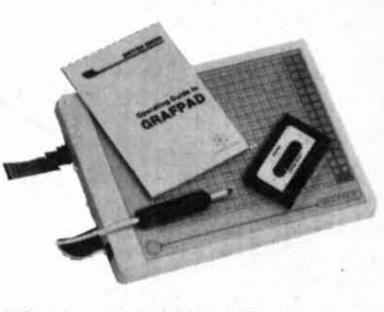
A Light Pen for BBC Micro including our highly sophisticated Pen-Pal software on tape.

Only: **£18**

(Please add £2 for software on disc)

WATFORD – Always a step ahead

GRAPH PAD



With this popular British Micro's Graph-pad, you can add new dimension to your computer enjoyment. It helps you to create your own application programs by the simple use of the Graphpad. Ideal for Educational use. Supplied complete with Cables, Manual and a two program cassette.

Price: **£125**

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WATFORD ELECTRONICS

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We are proud to announce the launch of our Double Density Board for the BBC Micro. The DDFS software that we supply is a version of our highly acclaimed standard 16K DFS for the BBC Micro. It will automatically tell whether a single or double density disc is being accessed, as well as allowing the option of reading 40 track disc on an 80 track drive. Now on your 80 track Double Sided Drive you will have 720K storage instead of the usual 400K and with higher speed than ever before (of course this is a BONUS at NO EXTRA COST).
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This space reserved for our 'Launch of the Year' Hardware

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See us at the ELECTRON & BBC MICRO USER SHOW Alexandra Palace London N22. July 19-22

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Price: 'Delta 14' Hand set	£12.50
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TRANSFER PROGRAM	Tape **£5.10** Disc **£7.95**

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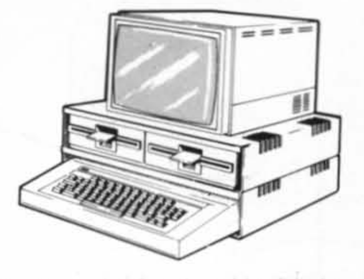

Protect your micro from the weight of the heavy TV/Monitor. This sturdy plinth is attractively finished in BBC colour. Air vent slots have been provided to allow maximum air circulation. It can be used to support a monitor or a printer. The micro slides underneath comfortably. A must for every BBC Micro owner, specially for those who have to move/open their computer frequently.

Single Decker	**£11** (carr. £1.50)
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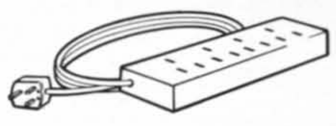

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- Easy to connect to the BBC Micro.
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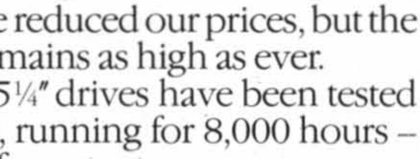

- All ½ height.
- Low power consumption.
- Comprehensive manual.
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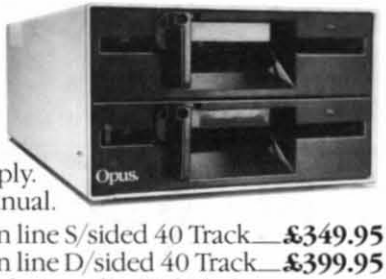

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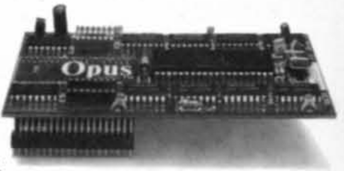

The ultimate Acorn compatible disc interface for your BBC Micro and 6502 2nd Processor.

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Part 16 of MIKE BIBBYs introduction to programming

Let subscripts give you power, power, power...

String arrays tucked under our belts, now let's look at the numeric variety . . .

LAST month we had a look at subscripted string variables. This was a way we could link a set, or array, of strings together by using numbers. For example A$(2) and A$(3) would be three separate but related strings.

Linking numbers with strings in this way allows us to use loops to deal with large numbers of strings. Program I illustrates the idea:

```
 10 REM *** PROGRAM I ***
 20 MODE 6
 30 DIM string$(3)
 40 string$(0)="Zeroth!"
 50 string$(1)="First"
 60 string$(2)="Second"
 70 string$(3)="Third"
 80 FOR loop%=0 TO 3
 90 PRINT string$(loop%)
100 NEXT loop%
```

Program I

Line 30 tells the computer exactly how many of the listed strings we're going to want. We say we're dimensioning the array. In fact:

```
DIM string$(3)
```

gives you four linked strings: *string$(0)*, *string$(1)*, *string$(2)* and *string$(3)*.

Remember, computers start counting at 0, not 1. (It must be to do with having no fingers!)

Lines 40-70 simply assign values to these subscripted variables and lines 80-100 print them out.

You can have subscripted numeric variables as well – they're directly analagous to subscripted string variables.

If you cast your mind back you'll remember there are two types of numeric variables – integer variables which deal with whole numbers only, and real variables which allow us to use decimals.

Integer variables have a % tagged on the end to distinguish them, in the same way as strings have $ on them. Real variables are not tagged in this way.

To get subscripted numeric variables, just use a legal variable name followed directly by brackets enclosing the indexing number, as we did with strings.

Hence *number(1)* would be legal as a variable, as would *number%(1)*.

The latter, however, is an integer variable. Of course, you'll have to dimension them first in the standard way to tell the micro what to expect.

Just use DIM followed by the highest subscripted variable.

Program II shows a rather trivial demonstration of these ideas – try adapting it using integer variables.

```
10 REM *** PROGRAM II ***
20 MODE 6
30 DIM number(2)
40 number(0)=1
50 number(1)=10
60 number(2)=100
70 FOR loop%=0 TO 2
80 PRINT number(loop%)
90 NEXT loop%
```

Program II

Once you've adapted it to integer variables try changing line 70 to:

```
70 loop% = 2 TO 0 STEP -1
```

Try to predict the result before running the program. Is it what you expected?

Program III shows a rather less contrived example of the same ideas:

The idea of the program is to calculate, then print out the squares and cubes of the numbers from 0 to 10.

There's quite a lot going on so we'll

```
   10 REM *** PROGRAM III ***
   20 MODE 6
   30 DIM square%(10), cube%(10)
   40 FOR loop%=0 TO 10
   50 square%(loop%)=loop%*loop%
   60 cube%(loop%)=loop%*loop%*loop%
   70 NEXT loop%
   80 FOR loop%= 0 TO 10
   90 PRINT loop%, square%(loop%),
cube%(loop%)
  100 NEXT loop%
```

Program III

take it step by step.

Line 30 is unusual in that so far we've only dimensioned one array. As you can see here, you can dimension several arrays after a DIM, provided that they are separated by commas. (Leave the commas out and see what happens).

Lines 40-70 form a loop which works out the squares and cubes from 0 to 10 storing them in *square%(0)* .... *square%(10)* and *cube%(0)* ... *cube%(10)* respectively.

Let's see how line 50 works. At first *loop%* is 0 so line 50 multiplies 0 by 0 and stores the result in *square%(0)*.

Next time through, *loop%* is 1 so line 50 multiplies 1 by 1 and stores the result in *square%(1)*.

On the next repetition *loop%* is 2 so the line multiplies 2 by 2 and stores the result in *square%* ... and so on.

Line 60 is very similar except that it multiplies by yet another *loop%* to give the cube which it then stores in *cube%(loop%)*.

So when *loop%* is 6, say, line 60 multiplies 6x6x6 and stores the result in *cube%(6)*.

Lines 80 to 100 then print out the results.

When you think about it, in line 60 you've already multiplied *loop%* by *loop%* and stored it in *square%(loop%)*, so you can alter line 60 to:

```
60 cube%(loop%) = square%(loop%) *
loop%
```

If that looks a bit puzzling, try working through 50 and 60 with actual values of *loop%* and it'll become clearer.

As it stands, the program is rather limited. For instance, why stick at 10?

Let's pick the maximum number we want at the beginning of the program and then DIM the arrays to take account of this.

So add line 25:

```
25 INPUT "Maximum number", max%
```

and then change line 30 to:

```
30 DIM square%(max%), cube%(max%)
```

We'll also have to change the loops so that they go up to *max%* instead of 10. Line 40 becomes:

```
40 FOR loop% = 0 TO max%
```

and line 50:

```
50 FOR loop% = 0 TO max%
```

We're going to be printing out screenfuls of information and the screen scrolls past so quickly you might miss some.

To counter this, the BBC Micro allows you to enter paged mode which prints out one screenful of information, then waits for you to press Shift before printing a new one.

You do this with the command VDU 14, so add a line 22 to the program:

```
22 VDU 14
```

Notice that I do it after the mode change. Changing mode automatically cancels the effect.

You'd also better add:

```
110 VDU 15
```

This cancels paged mode. It's good practice to restore the status quo when you leave a program!

And talking of good practice, the line numbers are in a real mess. Straighten them out by entering the following command:

```
RENUMBER
```

When you list the heavily modified program you should see Program IV:

```
   10 REM *** PROGRAM IV  ***
   20 MODE 6
   30 VDU 14
   40 INPUT "Maximum number", max%
   50 DIM square%(max%),cube%(max%)
   60 FOR loop%=0 TO max%
   70 square%(loop%)=loop%*loop%
   80 cube%(loop%)=loop%*loop%*loop%
   90 NEXT loop%
  100 FOR loop%=0 TO max%
  110 PRINT loop%, square%(loop%),
cube%(loop%)
  120 NEXT loop%
  130 VDU 15
```

Program IV

Experiment by running the program with small maximum values at first, then enter 1000. (I hope you haven't forgotten you need to press Shift to see each successive screen).

At the end of the run you should see:

```
1000  1000000  1E9
```

Don't worry, your micro hasn't gone berserk! It's just that 1000000000 (a thousand million) is a bit too big for it to manage, so it writes it in what's called exponential form, hence the 1E9.

Actually understanding the exponential form is quite easy. You probably remember from your schooldays that "10 to the power 2" is 100, "10 to the power 3" is 1000, "10 to the power 4" is 10000 and so on.

I bet that you learned to get the right answer – "it's a one followed by power number of zeros" – long before you understood what was going on.

Well all 1E9 means is 1 multiplied by 10 to the power 9, that is 1 followed by 9 zeros, which is the required 1000000000.

Your micro remembers all extremely long numbers like this, and they're quite easy to "translate". For example. 1.34E9 would be

1.34 = 1000000000
= 1340000000

Try running Program IV with a maximum value of 2000 and you'll get the message: "Too big at line 80".

What's happened is that *cube%(loop%)* has exceeded the biggest integer that can be stored in the micro, hence the message.

Actually *cube%(loop%)* must be rather large, since the biggest integer you can store is 2147483647.

To convince yourself of this, enter the following:

```
A%=2147483647
3%=2147483648
```

As soon as you press Return to enter *B%* you should get the error message "Too big".

Now try:

```
PRINT A%
```

and you should see 2.14748365E9.

The micro did accept 2147483647 as an integer, but it prints it out as 2.14748365E9 which translates to 2147483650.

Don't worry, the micro hasn't forgotten or approximated your integer – it remembers it fully. This "rounded" version is for display purposes only!

You can prove this by entering:

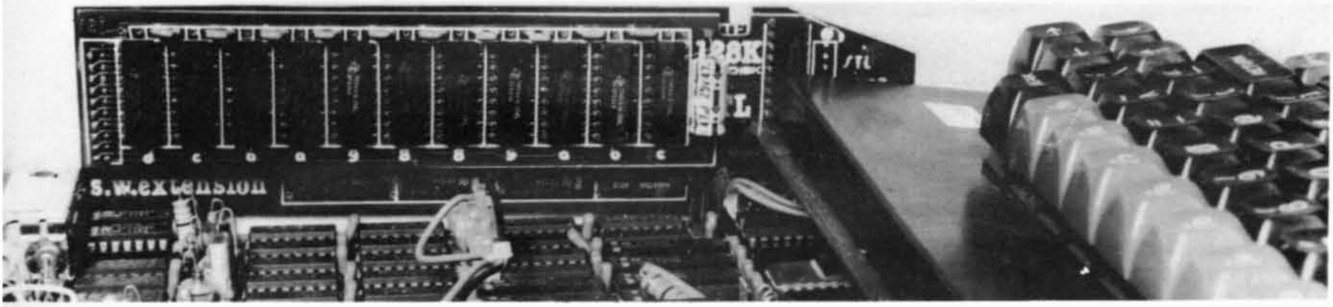
```
PRINT A% - 2000000000
```

The answer should be exact.

That's all for this month. I hope you haven't found the sums too difficult, they're only used as illustrations. The rest of this "course" is decidedly non-mathematical.

However we will touch on Program IV again next month, so perhaps you'd better save it and save yourself some typing!

SOLIDISK SIDEWAYS RAM: 8,000 UNITS SOLD



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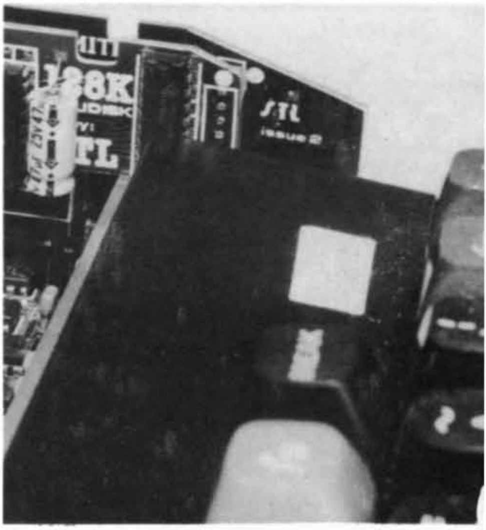

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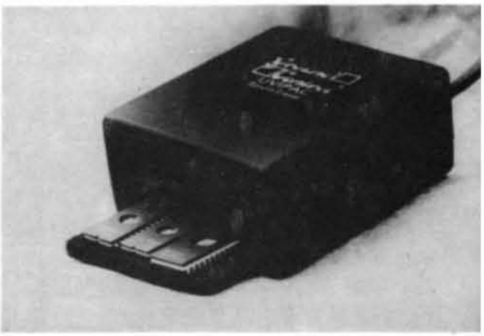

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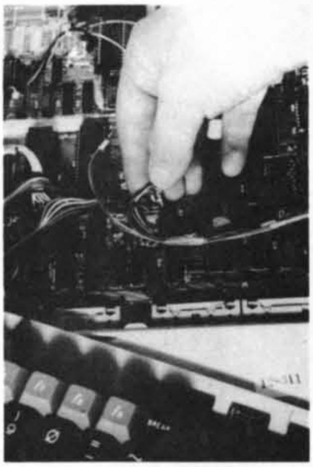

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GRAPHICS A LA MODE 7

ONE of the most useful features of the BBC Micro is Mode 7, the teletext mode. This is the one the micro enters automatically when you switch it on or press the Break key.

It's unlike any of the other modes of the micro and is in fact controlled by a special chip used only for teletext.

Because of this, the way it is used differs completely from the way we use the other graphics modes.

The beauty of Mode 7 is that it can be used to produce colourful, interesting screen displays which don't use up large chunks of precious memory.

In fact, you can get a whole screenful of teletext using just 1k of memory. This leaves you some 30k to use for your program.

Having said that, the graphics you can have in Mode 7 aren't all that advanced. But if you look at the BBC's Ceefax or ITV's Oracle you'll see that impressive displays can be produced.

As you'll probably know, the Mode 7 screen consists of 25 lines from top to bottom. Each can hold 40 characters across. Figure I shows the layout of the screen.

Notice that the first line is numbered 0, the last 24. It's the same with the character spaces, which are numbered from 0 to 39, not from 1 to 40 as might be expected.

Normally when we use Mode 7 all we get is white text on a black background. These are the default colours when we enter the mode.

For listings this is all right, but if we want to have a bit of colour in our Mode 7 displays, we have to tell the BBC Micro which colours we want.

We do this by using some beasties called control characters.

These are special characters we put on the screen to determine how the output appears for the rest of that line.

We print them on the screen just as we would the character "A" or "1". The difference is that after we've printed a control character we don't see it. A shy creature, it's just there to control the colour of the text, not to be seen itself.

To print "Hello" on the screen we would normally use a line like:

```
10 PRINT "Hello"
```

This would put the word up on screen in black and white. But suppose we wanted it in red?

What we would do is print a special control character in front of the "Hello", telling the micro that whatever comes next in that line is to appear in red.

The control character that produces red is the character with the number 129, so:

```
10 PRINT CHR$(129) "Hello"
```

will print the string "Hello" in red.

Figure II shows how the line is made up on screen. Notice that the control code takes up a space even though you don't see it. It blends in with the background.

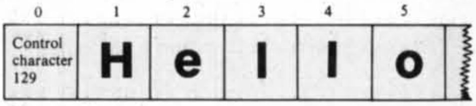

Figure II

There are seven colours available in Mode 7, each one with its own control character. Run Program I and you'll see them in action:

```
10 REM PROGRAM I
20 MODE 7
30 FOR code= 129 TO 135
40 PRINT CHR$ (code)"COLOUR CODE
   ";code
50 NEXT
```

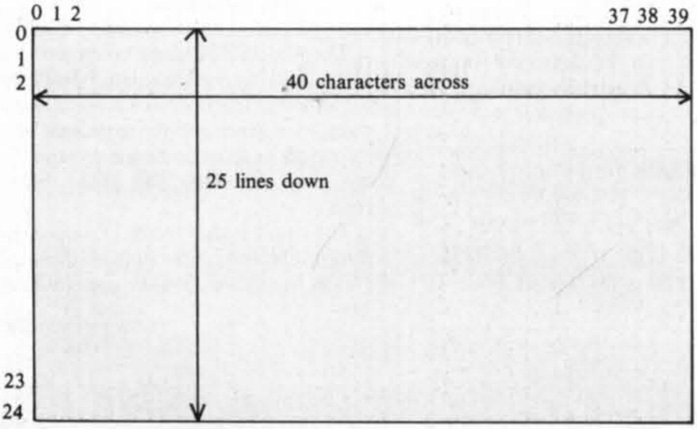

Figure I: Mode 7 screen dimensions

From Page 49

Colourful aren't they? The FOR . . . NEXT loop has printed out a different control character at the beginning of each line bringing about different coloured text each time.

These control character codes are shown in Figure III:

Number	Colour
129	Red
130	Green
131	Yellow
132	Blue
133	Magenta
134	Cyan
135	White

Figure III: Control codes

Remember that although we can't see it, the control character at the beginning of each line does take up one character space. Program II shows this:

```
10 REM PROGRAM II
20 MODE 7
25 PRINT "0123456789"
30 FOR code= 129 TO 135
40 PRINT CHR$ (code)"COLOUR CODE
    ";code
50 NEXT
```

This produces the same display as Program I with the added row of numbers at the top.

Notice that the character space 0 appears empty on each line. It's not actually empty, there's an invisible control character there which determines the colour for the rest of the line.

You can have more than one colour of text on a line as Program III shows:

```
10 REM PROGRAM III
20 MODE 7
30 PRINT CHR$ (129) "FIRST RED"
   CHR$ (132) "THEN BLUE"CHR$ (130)
    "THEN GREEN"
```

If you look at line 30, you'll see how this is done. First of all the control character 129 is printed.

We don't see this, but it decides the colour of whatever comes next in the line. Hence FIRST RED appears in red.

After this we print another control character, this time the one that produces blue. This overrides the previous command to print in red and so THEN BLUE appears in blue.

Not content with having only two colours on the line, there comes the control character for green and the last string appears in green.

Thus we can have more than one colour on a line by using more than one control character in that line. Each control character's influence lasts until either the end of that line or until it meets another control character which takes over command.

You'll notice that each control character still takes up one space, leaving gaps in the text. Figure IV shows what's happened.

As I said earlier, the control characters only have influence to the end of the line they appear on, or until another one takes over command.

When you finish one line and start printing on the next, the text will be in the default colour, white, unless you give the micro a different instruction by using another control character.

Program IV shows this in action:

```
10 REM PROGRAM IV
20 MODE 7
30 PRINT CHR$ (131) "THIS WORKS
    ON ONE LINE"
40 PRINT "BUT NOT ON THE NEXT"
```

The first line is in yellow because of the control character 131. However, the influence of 131 only lasts until the end of that particular line.

When the program comes to print the next line it finds no control character telling it what to do so it prints the text in white. If you want yellow text in the second line you have to put in the appropriate control code at the beginning as in program V:

```
10 REM PROGRAM V
20 MODE 7
30 PRINT CHR$ (131) "THIS WORKS
    ON ONE LINE"
40 PRINT CHR$ (131)"AND ON THIS
    LINE, NOW"
```

But what about the background, must it always be black? No, the control characters can be used to change the colour of the background. Program VI shows how this is done:

```
10 REM PROGRAM VI
20 MODE 7
30 PRINT CHR$ (130) CHR$ (157)
    CHR$ (129)"RED LETTERS ON A
    GREEN BACKGROUND"
```

The secret lies in control character 157. This tells the micro that the previous control character on that line (in this case control character 130) is to be the background colour.

So in line 30 the CHR$(130) selects the colour green and the following CHR$(157) tells the computer that this is to be the background colour.

Then CHR$(129) tells the micro that the foreground colour is to be red and so we get the red letters on a green background.

One thing to notice is that we have to set the foreground to a different colour to the background after using a CHR$(157). Otherwise the micro uses the same foreground and background colours with unimpressive results.

Try leaving out the CHR$(129) in line 30 and you'll see what I mean. As green lines go, it's very nice, but it doesn't tell you much!

Run Program VI again and notice that we've now used three control characters, all of which take up space. Program VII shows this:

```
10 REM PROGRAM VII
20 MODE 7
25 PRINT "01234567890123456789"
30 PRINT CHR$ (130) CHR$ (157)
    CHR$ (129)"RED LETTERS ON A
    GREEN BACKGROUND"
```

The CHR$(130) has taken up one space (and is invisible against the black background). The background now changes to green and the remaining two colour codes take up two more spaces, this time matching the green background.

The result is that the red text doesn't start until three spaces in from the side. Things like this have to be kept in mind

→

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CHR$ (129)	F	I	R	S	T		R	E	D	CHR$ (132)	T	H	E	N		B	L	U	E	CHR$ (130)	T	H	E	N		G	R	E	E	N

Figure IV: Multicoloured line layout

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From Page 50

when you plan your Mode 7 screen layouts.

The same control characters are used to get the background colours as are used to get the foreground colours. The only difference is the following CHR$(157) which sets the background to the colour of the previous foreground code.

Program VIII shows the available background colours:

```
10 REM PROGRAM VIII
20 MODE 7
25 PRINT "01234567890123456789"
30 FOR code=129 TO 135
40 PRINT CHR$ (code) CHR$ (157)
50 NEXT
```

You might notice that there is no control character for black, the default background colour. If we've changed background colour and want to revert to black again all we have to do is use CHR$(156) which switches to the black background again.

As you might guess from the above, we can change background colours in mid-line just as we can the foreground text colours. Program IX shows this in action:

```
10 REM PROGRAM IX
20 MODE 7
25 PRINT "0123456789012345678901234
5
6789"
30 PRINT CHR$ (129) CHR$ (157)
    CHR$ (131) "ONE BACKGROUND"
   CHR$ (131) CHR$ (157) CHR$ (132)
    "ANOTHER BACKGROUND"
```

Line 30 does all the work. The first CHR$(157) switches the background colour to red, as determined by the preceding CHR$(129).

The next CHR$(157) in that line has the control character CHR$(131) in front of it and hence the background is yellow.

The control characters, although invisibly blending with the background colours, still take up room, as Program IX illustrates.

So far we've covered the use of control characters to change both the foreground and background colours. If you've seen any teletext displays at all then you probably won't be surprised to learn that there's a control character that will make the text flash.

This is control character 136. If you put a CHR$(136) in a line then the text after it will flash, the foreground colour alternating between itself and the background colour.

Program X shows how it works:

```
10 REM PROGRAM X
20 MODE 7
25 PRINT "0123456789012345678901234
5
  6789"
30 PRINT CHR$ (136) CHR$ (129)
    CHR$ (157) CHR$ (131) "ONE BACKG
   ROUND"CHR$ (131) CHR$ (157)
    CHR$ (132) "ANOTHER BACKGROUND"
```

The effect can be turned off with a CHR$(137). Program XI shows both in action:

```
10 REM PROGRAM XI
20 MODE 7
30 PRINT CHR$ (136) CHR$ (129)
    CHR$ (157) CHR$ (131) "FLASHING"
   CHR$ (137) CHR$ (131) CHR$ (157)
    CHR$ (132) "NON-FLASHING"
```

Notice the amount of space used by the invisible control characters.

As well as flashing text, another useful feature of Mode 7 teletext displays is that of double height characters. Using the control character 141 makes all the subsequent text in that line appear as double height.

Program XII makes use of this:

```
10 REM PROGRAM XII
20 MODE 7
30 PRINT CHR$ (141)"DOUBLE HEIGHT"
40 PRINT CHR$ (141)"DOUBLE HEIGHT"
```

Line 40 is exactly the same as line 30. If it wasn't we would only get the top half of our double height text. Try leaving out line 30 or 40 when you run the program and you'll see what I mean.

Of course the other control characters can be used with the double height letters. This is shown in Program XIII which produces large red text:

```
10 REM PROGRAM XIII
20 MODE 7
30 PRINT CHR$ (141) CHR$ (129)"DOUBL
   E HEIGHT"
40 PRINT CHR$ (141) CHR$ (129)"DOUBL
   E HEIGHT"
```

Just as we can use CHR$(141) to turn on the double height effect, so there is a control code which returns the micro to normal height text.

This is CHR$(140) which is seen in action in Program XIV showing how double height and normal text can be mixed:

```
10 REM PROGRAM XIV
20 MODE 7
30 PRINT CHR$ (141) CHR$ (129)"DOUBL
   E HEIGHT"CHR$ (140)"NORMAL HEIGHT
   "
40 PRINT CHR$ (141) CHR$ (129)"DOUBL
   E HEIGHT"
```

As you might expect, you can use CHR$(136) to make the large characters flash:

```
10 REM PROGRAM XV
20 MODE 7
30 PRINT CHR$ (141) CHR$ (136)
    CHR$ (129)"DOUBLE HEIGHT"
40 PRINT CHR$ (141) CHR$ (136)
    CHR$ (129)"DOUBLE HEIGHT"
```

You can even use different background colours as with normal sized text:

```
10 REM PROGRAM XVI
20 MODE 7
25 PRINT "01234567890123456789"
30 PRINT CHR$ (141) CHR$ (136)
    CHR$ (130) CHR$ (157) CHR$ (129)
    "DOUBLE HEIGHT"
40 PRINT CHR$ (141) CHR$ (136)
    CHR$ (130) CHR$ (157) CHR$ (129)
    "DOUBLE HEIGHT"
```

So we've covered the basics of using the teletext mode. By now you should be able to use Mode 7 to produce colourful and pleasing displays of your own, using large and flashing letters to enliven the screen.

And we haven't even touched Mode 7 graphics, a void I propose to fill in my next article.

Finally, after making you type in all those CHR$, I'll inform you that you can use the VDU commands to pass the control characters to the micro.

Program XVII, which has exactly the same result as the previous program, shows how it's done:

```
10 REM PROGRAM XVII
20 MODE 7
30 VDU 141,136,130,157,129
   :PRINT "DOUBLE HEIGHT"
40 VDU 141,136,130,157,129
   :PRINT "DOUBLE HEIGHT"
```

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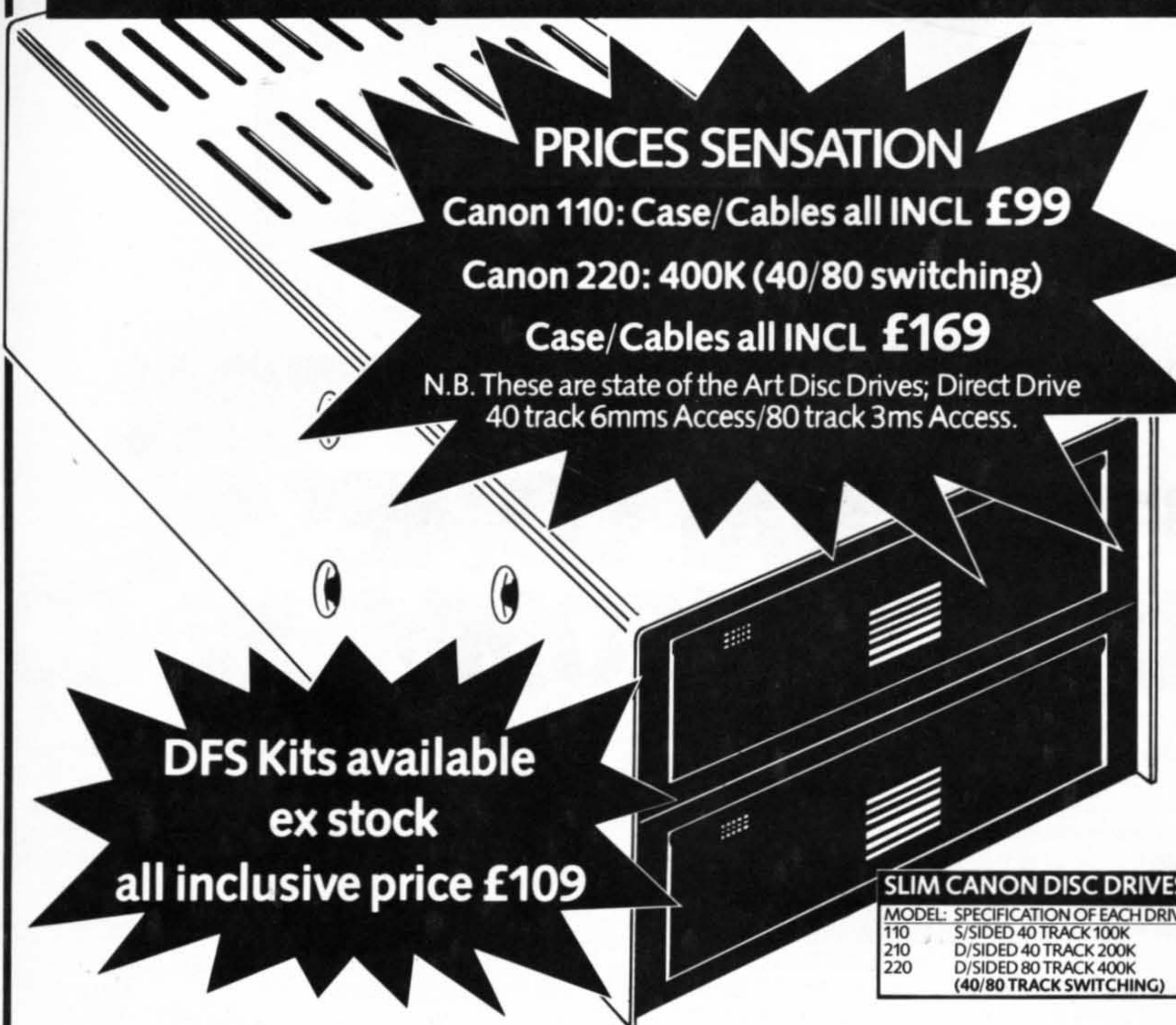

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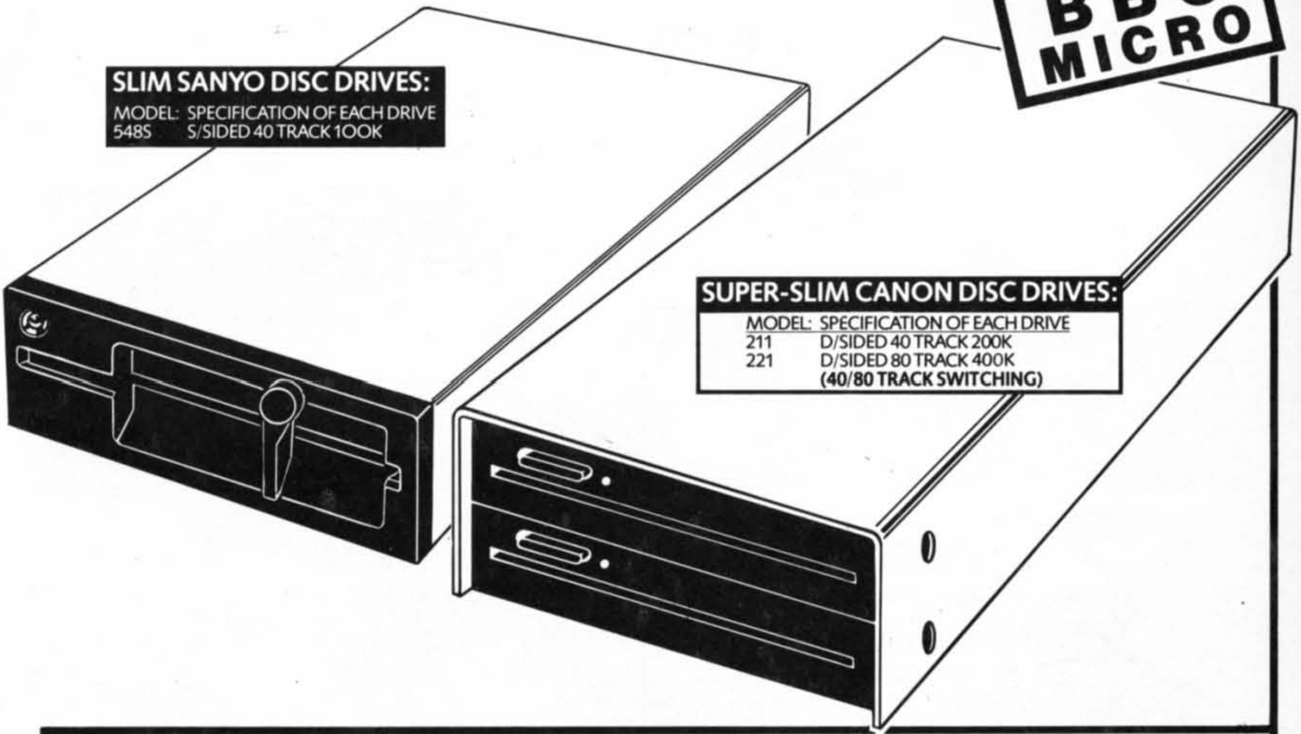

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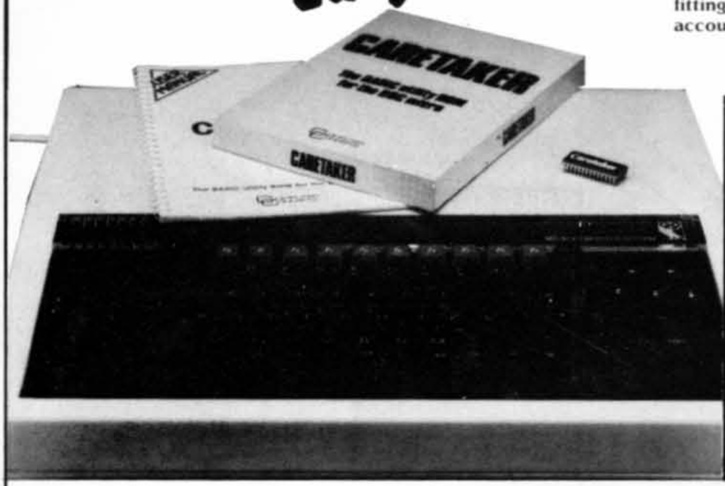

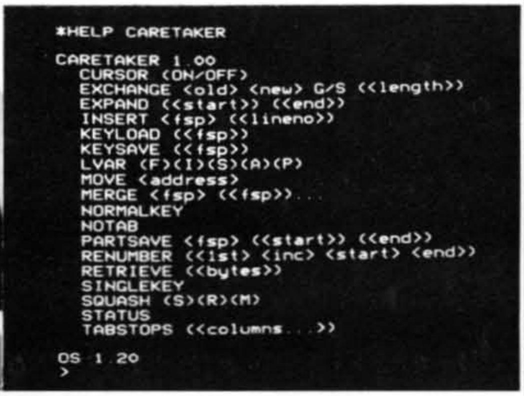
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   EXPAND <<start>> <<end>>
   INSERT <fsp> <<lineno>>
   KEYLOAD <<fsp>>
   KEYSAVE <<fsp>>
   LVAR (F)(I)(S)(A)(P)
   MOVE <address>
   MERGE <fsp> <<fsp>>...
   NORMALKEY
   NOTAB
   PARTSAVE <fsp> <<start>> <<end>>
   RENUMBER <<1st> <inc> <start> <end>>
   RETRIEVE <<bytes>>
   SINGLEKEY
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   TABSTOPS <<columns...>>

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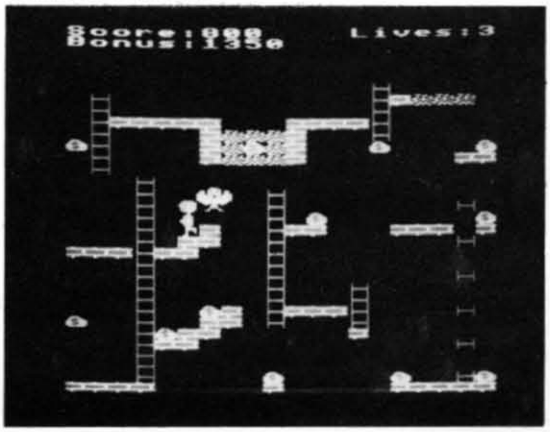

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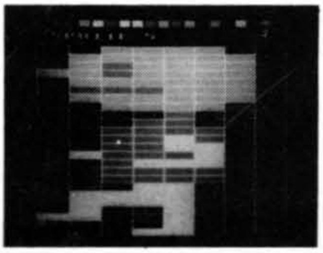

JIM NOTMAN explores the teletext mode on the BBC Micro

A screen editor for teletext

THE teletext mode (Mode 7) has the great advantage of only using 1k of memory. The next most economical mode, Mode 6, takes 8k.

However even the most fervent supporters of Mode 7 will recognise that it's not easy to learn, especially if only PRINT statements are used to design a complete screenful of information.

In teletext the Ascii codes are divided into printable characters and control codes. These control codes are responsible for the many effects that are possible.

Remember that any of the effects produced on Ceefax or Oracle can be produced on your own screen.

The teletext screen editor described here allows you to do all this. Here are some possible uses for it:

- **As an aid to learning.** Use it to find out how to get the best out of using teletext.

The program allows you to change any character on a line at will, testing the appearances the control codes produce.

- **To prepare title pages for programs.** This seems to be one of the most familiar areas of Mode 7 use, particularly with the cassette filing system.

Here a short initial program is loaded and a screenful of information displayed while the main program is being loaded.

You can easily do this yourself. After designing a teletext page and saving it on tape or disc, write the short introductory program, something like this:

```
10 REM PAGE TITLE TEST
20 CLS
30 FOR I%=0 TO 956 STEP 4
40 I%!&7C00=I%!TOP
50 NEXT
60 CHAIN "main_prog"
```

Only after the initial program is finished should the Mode 7 screen be added. Find the memory address to put the screen information into by typing in:

```
PRINT ~TOP
```

Note the figures that are given. Now load the screen file into memory with the *LOAD command, using the name of the screen file and the address to where it must be loaded as found by TOP, something like:

```
*LOAD "screen" ADDRESS
```

The introductory program can now be saved with:

```
*SAVE "intro" START +LENGTH
```

where START is found with:

```
PRINT ~PAGE
```

and LENGTH is found from:

```
PRINT~TOP-PAGE+&3C1
```

The screen length here is enough for the upper 24 lines of a 25 line screen. In the editor program the bottom line is used as a "status" line.

	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9
SHIFT	nothing 128	A. Red 129	A. Green 130	A. Yellow 131	A. Blue 132	A. Magenta 133	A. Cyan 134	A. White 135	Flashing 136	Steady 137
CONTROL	Normal Ht 140	Double Ht 141	nothing 142	nothing 143	nothing 144	G. Red 145	G. Green 146	G. Yellow 147	G. Blue 148	G. Magenta 149
SHIFT CONTROL	G. Cyan 150	G. White 151	Conceal Dis. 152	Contig. G 153	Separate G 154	nothing 155	Blk Backgnd 156	New Backgnd 157	Hold G. 158	Release G. 159

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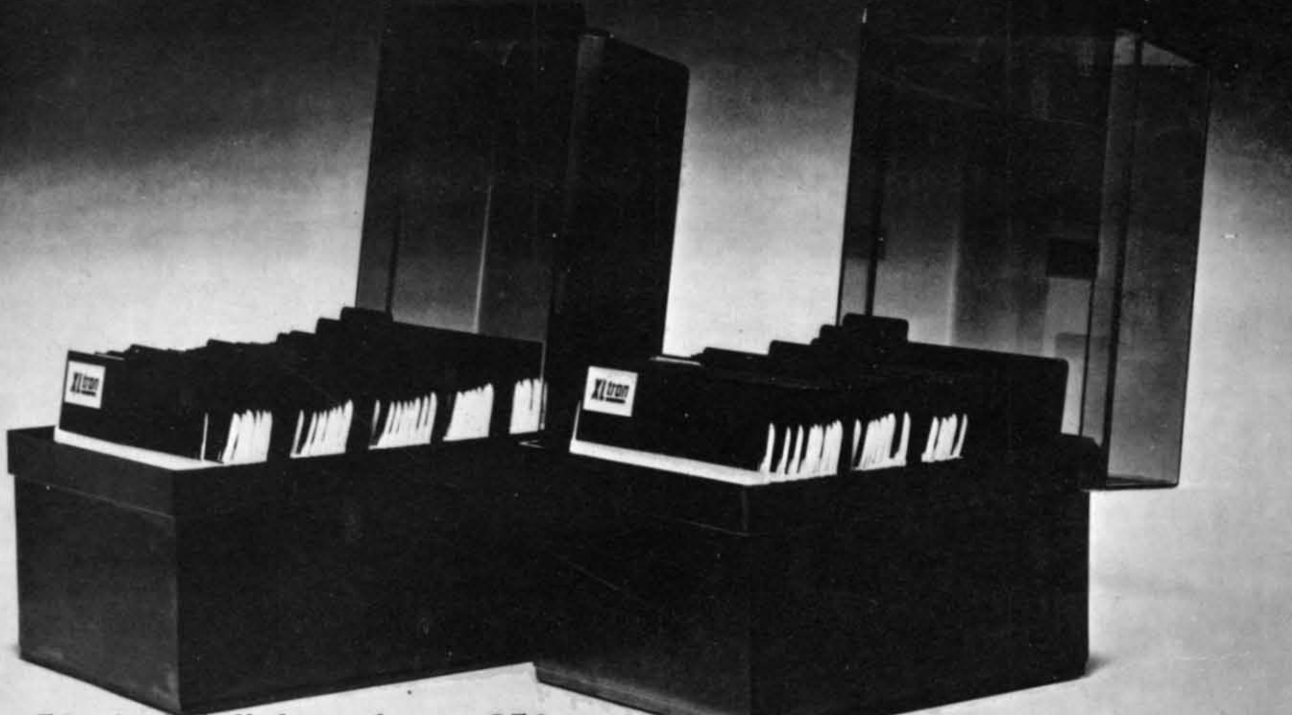

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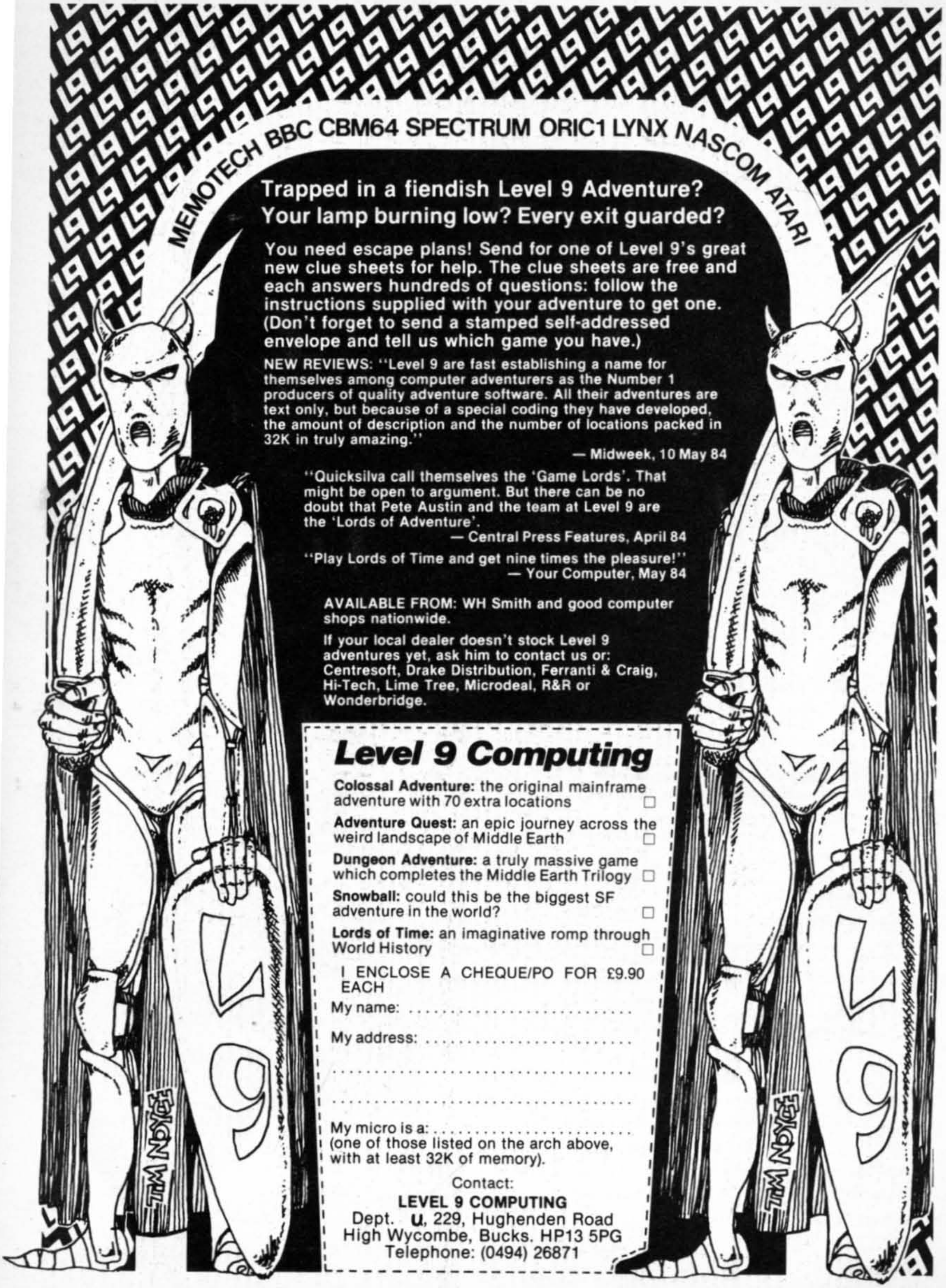
MU/8


MEMOTECH BBC CBM64 SPECTRUM ORIC1 LYNX NASCOM ATARI
L9
TIM NOYCE

Trapped in a fiendish Level 9 Adventure?
Your lamp burning low? Every exit guarded?

You need escape plans! Send for one of Level 9's great new clue sheets for help. The clue sheets are free and each answers hundreds of questions: follow the instructions supplied with your adventure to get one. (Don't forget to send a stamped self-addressed envelope and tell us which game you have.)

NEW REVIEWS: "Level 9 are fast establishing a name for themselves among computer adventurers as the Number 1 producers of quality adventure software. All their adventures are text only, but because of a special coding they have developed, the amount of description and the number of locations packed in 32K in truly amazing."

— Midweek, 10 May 84

"Quicksilva call themselves the 'Game Lords'. That might be open to argument. But there can be no doubt that Pete Austin and the team at Level 9 are the 'Lords of Adventure'.

— Central Press Features, April 84

"Play Lords of Time and get nine times the pleasure!"

— Your Computer, May 84

AVAILABLE FROM: WH Smith and good computer shops nationwide.

If your local dealer doesn't stock Level 9 adventures yet, ask him to contact us or: Centresoft, Drake Distribution, Ferranti & Craig, Hi-Tech, Lime Tree, Microdeal, R&R or Wonderbridge.

Level 9 Computing

Colossal Adventure: the original mainframe adventure with 70 extra locations ☐

Adventure Quest: an epic journey across the weird landscape of Middle Earth ☐

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I ENCLOSE A CHEQUE/PO FOR £9.90 EACH

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My micro is a: ....
(one of those listed on the arch above, with at least 32K of memory).

Contact:
LEVEL 9 COMPUTING
Dept. **U**, 229, Hughenden Road
High Wycombe, Bucks. HP13 5PG
Telephone: (0494) 26871

From Page 57

- **To prepare pages of information.** These can be used within programs, for advertising, and even on local TV networks.
- **To do simple animation.** You can swop around various pages that are held in memory.
- **To prepare slides.** Yes, straight photographs of the screen can produce slides adequate enough for projection.

The main points to note here are that the result is going to depend heavily on the quality of the monitor. To ensure good results a good resolution monitor is essential.

To prevent camera shake a tripod should be used. Make sure that the shutter speed is low, preferably about 1/30th of a second.

With a faster shutter speed – especially faster than 1/60th of a second – dark bands will appear across the slide due to the way the screen is normally built up.

This teletext editor allows any character or teletext control code to be placed anywhere on the screen – except the bottom line, which is used as a status line, giving the X and Y coordinates of the cursor and the character under the cursor.

This is especially important with teletext control characters as they cannot be seen directly, only inferred from their effects.

All the printable characters can be generated from the keyboard. All characters with Ascii value 160 to 255 can be produced by pressing the Tab key first. 128 will be added to the Ascii value of the next key pressed.

For example, to produce CHR$(255) press Tab followed by Delete (Ascii value 127).

Most of the characters from Ascii 160 to 254 are the same as those between 32 and 126, the only difference being that 128 is added to the Ascii number.

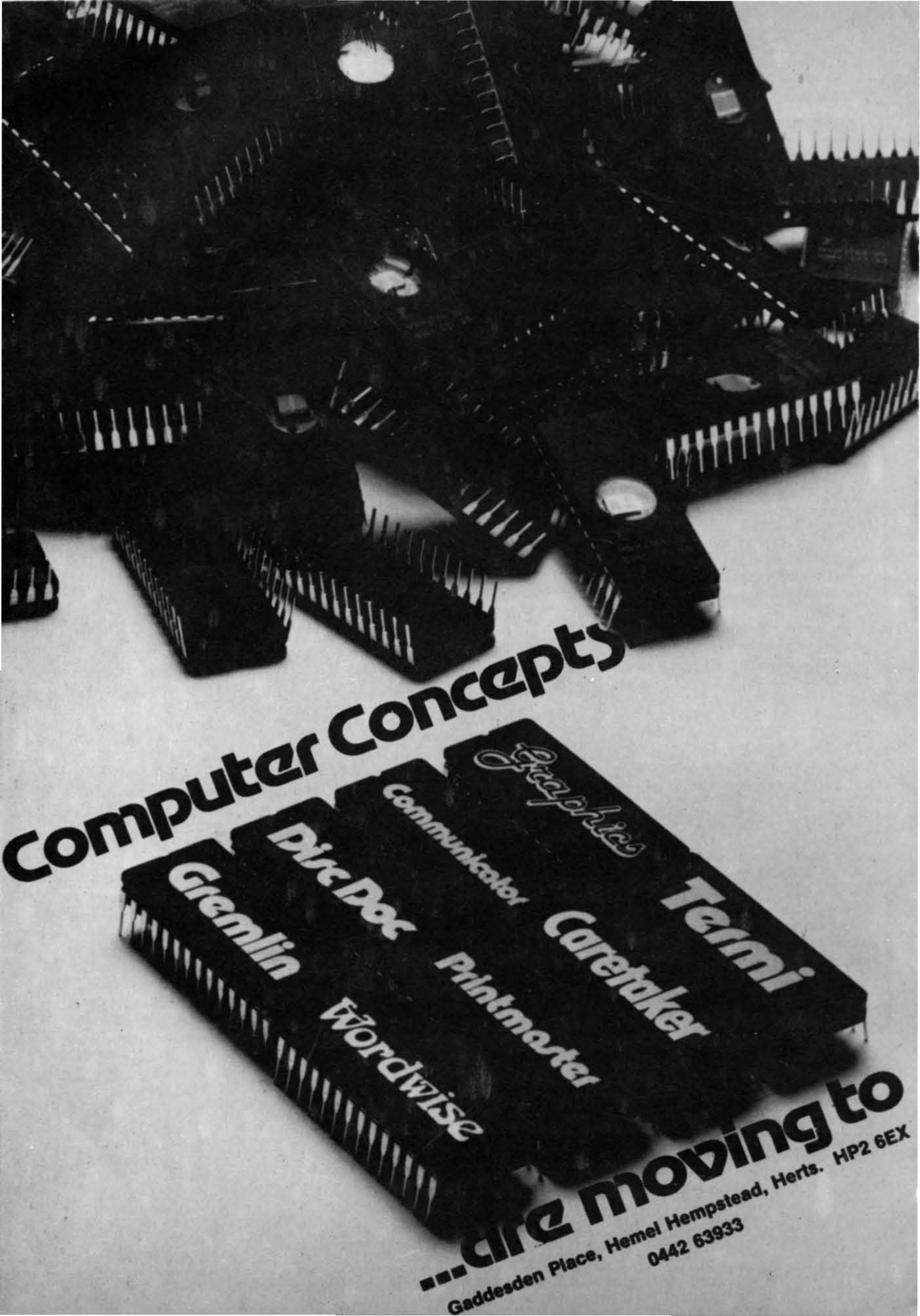
However there are some differences. The #, £ and _ signs are in different positions in the teletext character generator compared with the characters in Mode 0 to 6.

Normally you are not aware of the differences between the modes because the operating system only swaps around the £, # and characters with an Ascii value less than 127, hence the slight difference.

Program description

90-160	The main loop of the program.
100	PROCread will read the character under the cursor.
110	Adds 128 to the value of a key if Tab is pressed. Makes a sound as a warning.
120+140	Direct cursor controls to PROCcursor.
130	Protects the screen from any inadvertent screen control codes.
150	PROCwrit puts a character on the screen and updates cursor position.
170	If Escape key pressed then PROCcmd. Otherwise if an error has occurred then PROCerror, Initialisation.
210	*max* is the number of different screen.
220	*trans* is a flag that is used to signal whether a copy of the screen has been placed in memory when a help page is displayed.
230	Saves space in memory for five screens of information.
240	Saves space for commands that can be sent to the operating system.
250-290	Note location of the various screens in memory.
300-310	Set screen memory locations to &20 (Ascii for space).
330-350	Set base addresses of function keys with Shift and/or Ctrl.
360	Allows cursor keys to be programmed.
370-400	Normally when the cursor keys are set to produce Ascii codes, some of these codes are also teletext control codes. These line set cursor keys to produce Ascii codes which are not teletext control codes.
410	Initial cursor position and screen number.
420	Programs the 6845 to give a large cursor.
430	Switches off cursor.
470	The value of *S%* will depend on which filing system is in force. *S%*=4 for DFS, *S%*=1 for TAPE (1200 baud), *S%*=2 for TAPE (300 baud).
510-570	Control movement of cursor. Allows "wrap round" but doesn't change row with cursor left and right nor column with cursor up and down.
600	Clears bottom line.
630	Cursor off.
640-650	Reads character at X,Y
670	Prints X and Y coordinate of cursor.
680	If it's a teletext code, PROCcode for decoding ELSE PROCchar.
690	Prints current screen number.
700	Moves cursor to current screen position. Turns cursor on.
740	Prints both Ascii number and character itself.
780	Puts character on screen, updates cursor position, according to the movement flag *M*.
830-860	Search for and print meaning of teletext code.
890	Command routine selected by pressing Escape.
900	Cursor off.
910	Clears bottom line.
920	Prints first letter of commands.
930	The initial letters of the commands are selected using INSTR. Note that each command is written twice so that it doesn't matter whether the key is shifted or not.
950-1040	Select appropriate command.
1050	Restores default text window, turns cursor on.
1130-1140	Check that you really want to insert a line.
1160-1220	Insert a line from current line. The information from the bottom line is lost.
1230-1240	Check that you really want to delete the line.
1250-1270	Overwrite the line the cursor is on, moving up lower lines.
1280	Adds a blank lower line.
1320	Sets a text window on the bottom line. This is to prevent any scrolling of the screen.
1330	Finds which file system is active.
1350	If DFS is active gets the drive number.

▶


Computer Concepts
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Disc Doc
Gremlin
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Caretaker
Printmaster
Wordwise
...are moving to
Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX
0442 63933

From Page 61

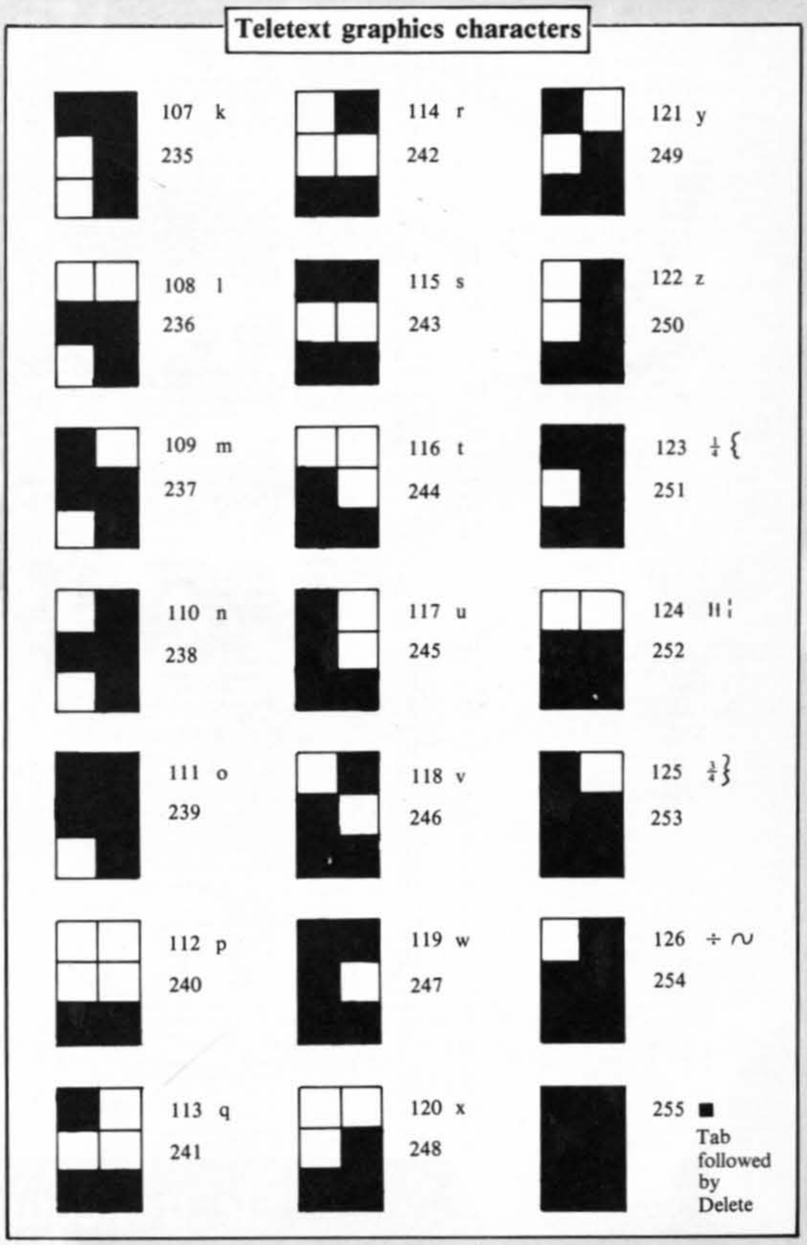
1360	Assembles command from *a$*="SAVE" or "LOAD".
1370	OSCLI as a Basic command is only available in Basic II. This method is compatible with Basic I.
1380	Restores normal text windows.
1420	Transfers a copy current screen to memory.
1430-1440	Gets new screen number.
1460	Transfers a copy memory to screen.
1510	Prints "Are you sure?" message.
1520	Only accepts Y or N (upper and lower case).
1560-1570	Confirm intention to wipe screen.
1580	Clears screen.
1590	Transfers copy of cleared screen to memory.
1630	Transfers the current screen to memory only if it has not already been done. This stops the anomaly of overwriting memory if the Escape key is pressed during display of the help page and the help page selected again.
1640	Restores default windows, clear screen.
1650-1730	Prints help page.
1750	Transfers current screen back from memory.
1790	Transfers the current screen to memory only if it has not already been done.
1800	Clears screen, sets text window.
1810-1860	Print cursor movement options.
1870	Only accepts values 1, 2 and 3.
1880	Transfers current screen back from memory.
1920	*P%* is a pointer into memory where the screen is to be stored.
1930	Copies the screen to its store.
1970	Sets *P%* to point to the memory where the screen has been stored.
1980	Copies memory to the screen.
2020	Restores default text window, moves the cursor to bottom line, makes a sound, reports the error.
2040	Waits for up to 750 centiseconds.
2050	Cursor on. Makes a sound.
2080-2200	Data for decoding the teletext control characters.

TO simplify the use of the screen editor we are giving the graphics shapes available together with their Ascii values and the characters needed to enter them directly from the keyboard.

We've also included a strip to slip under the perspex panel on your micro. It contains all the control codes available from the function keys.

Full listing starts on Page 154

Teletext graphics characters



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BCAIVOOD	Adventure International Voodoo Castle	7.35	8.46
BCAKCHIL	ASK Children from Space (XBE16)	7.35	8.46
BCAKCRAN	ASK Cranky (XBE17)	7.35	8.46
BCAKFACE	ASK Facemaker (XBE10)	7.35	8.46
BCAKHIDE	ASK Hide & Seek (XBE11)	7.35	8.46
BCAKLETS	ASK Let's Count (XBE12)	7.35	8.46
BCAKNUMC	ASK Number Chaser (XBE15)	7.35	8.46
BCAKNUMG	ASK Number Gulper (XBR13)	5.82	6.70
BCAKNUMP	ASK Number Puzzler (XBE14)	7.35	8.46
BCAKTABL	ASK Table Adventures (XBE18)	7.35	8.46
BCAKWORD	ASK Words, Words, Words (XBE19)	7.35	8.46
BCALABM	Alligata Software ABM (Laser Command)	4.39	5.05
BCALBLAG	Alligata Software Blagger	6.61	7.60
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BCALCOSM	Alligata Software Cosmic Asteroids	4.39	5.05
BCALDAMB	Alligata Software Dambusters	5.87	6.75
BCALEAGL	Alligata Software Eagle Empire	5.87	6.75
BCALFRUI	Alligata Software Fruit Machine (B006)	4.39	5.05
BCALLUNA	Alligata Software Lunar Rescue (B007)	5.87	6.75
BCAMALGE	Ampalsoft Cheshire Cat Algebra O level	5.13	5.90
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BCAS100P	Acornsoft 100 Programs for BBC Micro	8.50	9.78
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BCASBUSI	Acornsoft Business Games (SBE03)	7.35	8.46
BCASCARO	Acornsoft Carousel (SBG24)	7.35	8.46
BCASCAST	Acornsoft Castle of Riddles (SBG17)	7.35	8.46
BCASCHAN	Acornsoft Chemical Analysis (SBE12)	10.20	11.73
BCASCHES	Acornsoft Chess (SBG10)	7.35	8.46
BCASCHSI	Acornsoft Chemical Simulations (SBE13)	10.20	11.73
BCASCHST	Acornsoft Chemical Structures (SBE14)	10.20	11.73
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BCASCRAZ	Acornsoft Crazy Tracer (SBG26) (B)	7.35	8.46
BCASCREA	Acornsoft Creative Graphics (SBX01)	7.35	8.46
BCASDESK	Acornsoft Desk Diary (SBB01)	7.35	8.46
BCASDRAU	Acornsoft Draughts & Reversi (B) (SBG20)	7.35	8.46
BCASEXAM	Acornsoft Examiner Cassette (SBE17) (B)	7.35	8.46
BCASFORE	Acornsoft Forecast (SBB02)	8.80	10.12
BCASFORT	Acornsoft Forth Cassette (SBL01)	12.45	14.32
BCASFREE	Acornsoft Free Fall (SBG28)	7.35	8.46
BCASFREN	Acornsoft French (Linkword) (SBX13)	11.05	12.71
BCASGERM	Acornsoft German (Linkword) (SBX16)	11.05	12.71
BCASGRAO	Acornsoft Graphics on the BBC	8.50	9.78
BCASGRAP	Acornsoft Graphs & Charts (SBX02)	7.35	8.46
BCASHOOK	A'soft/ICL Hooked on Numbers (SBX08)	7.35	8.46
BCASHOPP	Acornsoft Hopper (SBG23)	7.35	8.46
BCASITAL	Acornsoft Italian (Linkword) (SBX14)	11.05	12.71
BCASJARS	Acornsoft Jars (SBE15)	8.83	10.16
BCASJCBD	Acornsoft JCB Digger (SBG09)	7.35	8.46
BCASLISD	Acornsoft Lisp Demo Progs SBL09	7.35	8.46
BCASLISP	Acornsoft Lisp Cassette (SBL02)	12.45	14.32
BCASMAGI	Acornsoft Magic Garden (B) (SBX04)	7.35	8.46
BCASMEMB	Acornsoft/ICL M'ship Manager (SBX06)	7.35	8.46
BCASMETE	Acornsoft Meteors (SBG13)	7.35	8.46
BCASMICR	Acornsoft Microtext (SBL04)	36.85	42.37
BCASMISB	Acornsoft Missile Base (SBG18)	7.35	8.46
BCASMISS	Acornsoft Missing Signs (SBE09)	8.83	10.16
BCASMONS	Acornsoft Monsters (SBG03)	7.35	8.46
BCASNUMB	Acornsoft Number Balance (SBE08)	8.83	10.16
BCASONET	Acornsoft/ICL One to Nine (SBX07)	7.35	8.46
BCASPEEK	Acornsoft Peeko-Computer Pack (SBE02)	7.35	8.46
BCASPERS	Acornsoft Personal Money M'ment SBB5	8.80	10.12
BCASPHIL	Acornsoft Philosophers Quest (SBG01)	7.35	8.46
BCASPICT	Acornsoft Picture Maker (SBX03)	7.35	8.46
BCASPLAN	Acornsoft Planetoid (Defender) (SBG15)	7.35	8.46
BCASROCK	Acornsoft Rocket Raid (SBG05)	7.35	8.46
BCASSENT	Acornsoft Sentence Sequencing (SBE07)	8.83	10.16
BCASSINV	Acornsoft Super Invaders (SBG16)	7.35	8.46
BCASSLID	Acornsoft Sliding block puzzles (SBG12)	7.35	8.46
BCASSNAP	Acornsoft Snapper (SBG04)	7.35	8.46
BCASSNOO	Acornsoft Snooker (SBG21)	7.35	8.46
BCASSPAN	Acornsoft Spanish (Linkword) (SBX15)	11.05	12.71
BCASSPAS	Acornsoft S Pascal (SBL08)	12.45	14.32
BCASSPHI	Acornsoft Sphinx Adventure (SBG07)	7.35	8.46
BCASSTAR	Acornsoft Starship Command (SBG22)	7.35	8.46
BCASTREE	Acornsoft Tree of Knowledge (SBE04)	7.35	8.46
BCASWORH	Acornsoft Word Hunt (SBE05)	8.83	10.16
BCASWORS	Acornsoft Word Sequencing (SBE06)	8.83	10.16
BCBEAVM	BES Animal Vegetable Mineral (XBE03)	6.63	7.62
BCBEHAPL	BES Happy Letters (XBE07)	6.63	7.62
BCBEHAPN	BES Happy Numbers (XBE04)	6.63	7.62
BCBEMAPR	BES Map Rally (XBE08)	6.63	7.62
BCBETIM1	BES Timeman One (XBE05)	6.63	7.62
BCBETIM2	BES Timeman Two (XBE06)	6.63	7.62
BCBEWORH	BES Wordhang (XBE02)	6.63	7.62
BCBEWORW	BES World-Wise (XBE01)	6.63	7.62
BCBSBEYO	BBCsoft Beyond Basic Cassette (B)	8.50	9.78
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BCBSDRAW	BBCsoft Drawing	7.40	8.50
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BCGHTSHA	Good Houseke'g Mr T's Shape Game	9.57	11.01
BCGHTTEL	Good Houseke'g Mr T Tells the Time	9.57	11.01
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BCIJ3DMA	IJK 3D Maze for BBC (7)	3.32	3.82
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BCIJSTRA	IJK Stratobomber for BBC (14)	5.54	6.37
BCJOYSTI	Joystick Utility program for BBC	5.06	5.82
BCKAGALA	Kansas Galactic Firebird	7.01	8.06
BCKAPINB	Kansas Pinball Arcade	7.01	8.06
BCKDPASS	Kay Dee Software Pass Go	7.23	8.31
BCKOFREA	Kosmos Software French Mistress A	7.35	8.46
BCKOFREB	Kosmos Software French Mistress B	7.35	8.46
BCKOGERA	Kosmos Software German Master A	7.35	8.46
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BCKOSPAA	Kosmos Software Spanish Tutor A	7.35	8.46
BCKOSPAB	Kosmos Software Spanish Tutor B	7.35	8.46
BCL9COLO	Level 9 Colossal Adventure (B)	7.32	8.42
BCL9DUNG	Level 9 Dungeons (B)	7.32	8.42
BCL9LORD	Level 9 Lords of Time (b)	7.32	8.42
BCL9SNOW	Level 9 Snowball (B)	7.32	8.42
BCMHHOBB	Melbourne House Hobbit	11.05	12.71
BCMSFIRS	Mirrorsoft First Steps with the Mr. Men	6.61	7.60
BCMSQUIC	Mirrorsoft Quick Thinking (B)	5.13	5.90
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BCPAFORT	Pace Software Fortress	6.61	7.60
BCPPADVE	Program Power Adventure (B)	5.87	6.75
BCPPALID	Program Power Alien Destroyers (Invader)	5.91	6.79
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BCPPBAND	Program Power Bandits at 3 o'clock	5.14	5.91
BCPPBARR	Program Power Barrage for BBC	5.13	5.90
BCPPBEEB	Program Power Beeb-Tote (B)	4.40	5.06
BCPPBUMB	Program Power Bumble Bee (B)	5.87	6.75
BCPPCAVA	Program Power Caveman Adventure	5.06	5.82
BCPPCH16	Program Power BBC Chess (16K)	3.66	4.20
BCPPCHEM	Program Power Chemistry	5.13	5.90
BCPPCHES	Program Power Chess	5.87	6.75
BCPPCONS	Program Power Constellation	5.87	6.75
BCPPCOSM	Program Power Cosmic Combat (B)	5.14	5.91
BCPPCOWB	Program Power Cowboy Shoot-out	5.06	5.82
BCPPCROA	Program Power Croaker	5.87	6.75
BCPPCYBE	Program Power Cybertron Mission (B)	5.87	6.75
BCPPDANG	Program Power Danger! UXB	5.87	6.75
BCPPDEMD	Program Power Demon Decorator (Painter)	5.06	5.82
BCPPDIS	Program Power BBC Disassembler	5.06	5.82
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BCPPESCA	Program Power Escape from M'base Alpha	5.87	6.75
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BCPPMASM	Program Power Mastermind for BBC	3.36	3.86
BCPPMAZE	Program Power Maze Invaders (B)	4.40	5.06
BCPPMINE	Program Power Mine (B)	5.87	6.75
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BCPPREV2	Program Power Reversi (32K)	4.21	4.84
BCPPROUL	Program Power Roulette for BBC	4.21	4.84
BCPPSEEK	Program Power Seek	5.06	5.82
BCPPSPAC	Program Power Space Jailer (B)	5.14	5.91
BCPPSTAR	Program Power Startrek	4.21	4.84
BCPPSWOO	Program Power Swoop	5.87	6.75
BCPPTIMT	Program Power Timetrek (Startrek Plus)	5.87	6.75
BCPPWALL	Program Power Wall (B)	4.40	5.06
BCPPWHER	Program Power Where (B)	5.14	5.91
BCPPWHIC	Program Power Wich Salt?	5.14	5.91
BCPPWORL	Program Power World Geography (B)	5.14	5.91
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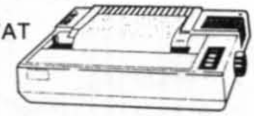
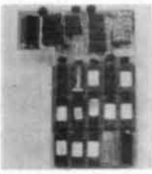


Printer price includes cable for BBC and screen dump rom is available for £11.50

SIDEWISE



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No soldering required £38.00 + VAT

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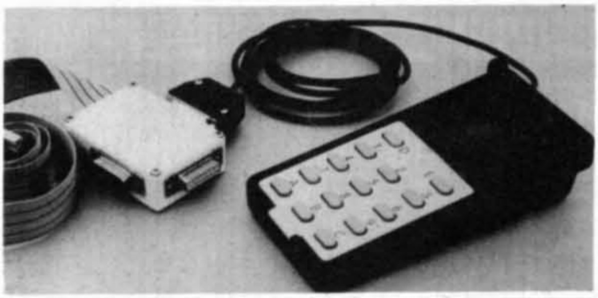

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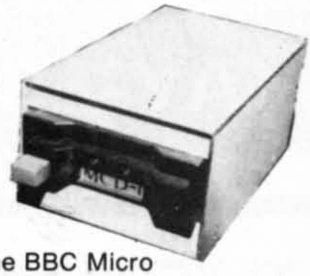

Micro Disc Drive for the BBC Micro

The Micro disc drive offers a method of low cost quick access to programs. The drive is essentially a small version of a 5¼" disc drive and offers similar features to the larger drive.
The data is stored on a 3" disc, this is enclosed in a protective hard plastic cassette which features a write protect switch.
The micro drive requires the standard Acorn disc interface, but a new disc filing system rom. Acorn DFS may be exchanged for the micro DFS for £12.00. The new micro disc filing system can read and write to Acorn DFS discs.
Thus if a 5¼ inch and a micro floppy were connected on the same cable files could be transferred between them.
Capacity: 80.64 K bytes **Transfer Rate:** 125k bit/s.

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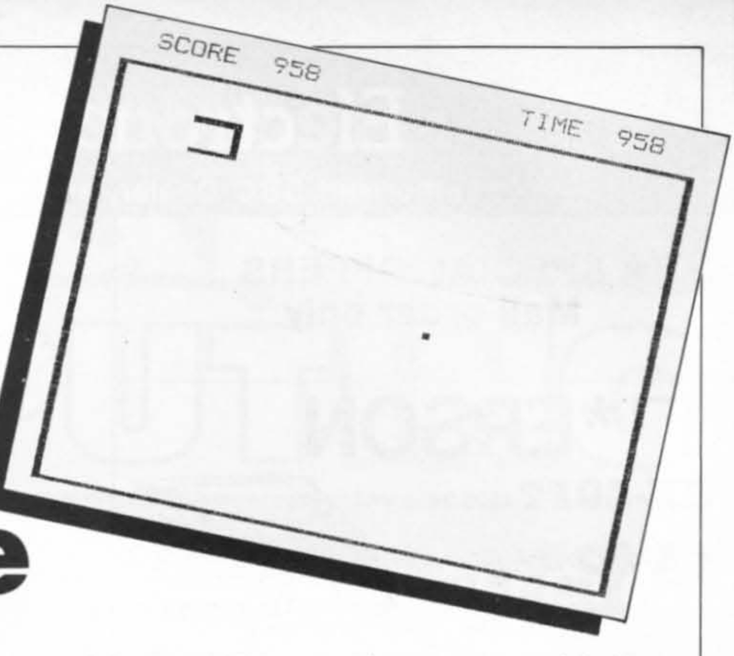
BBC

A simple yet addictive game by ROBIN NIXON

Sqwhere up to the challenge



SQWHERE? is one of those games based on a simple idea that proves totally addictive. It's infuriating, entertaining and suitable for the whole family.

However its main virtue is that it requires only two key strokes to play – making it ideal for disabled people, for whom it was originally designed. In fact you can use a two-switch games paddle to play the game. It was adapted to keyboard switches when it proved to be a hit with able-bodied people too.

All you have to do is to manoeuvre a bouncing ball inside a square by changing its horizontal and vertical movement.

Unfortunately only one side of the square is open to you – and that keeps varying. Even worse, every now and then the target square moves to another section of the screen, more frequently as you progress up the levels.

Oh yes – and there's a time limit of 1,000 units in which to complete each frame.

Turn to Page 167

KAY-ESS COMPUTER PRODUCTS

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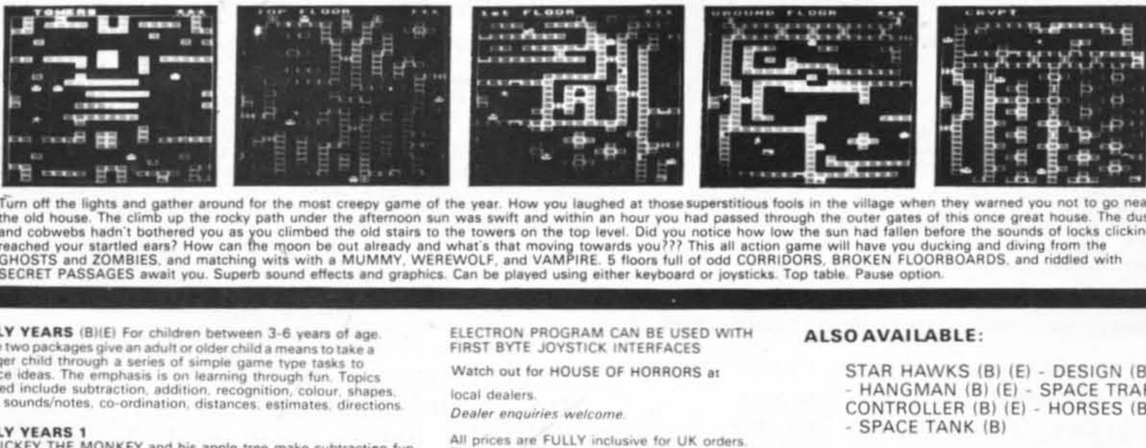
HOUSE OF HORRORS **(B)(E)** £6.95



Turn off the lights and gather around for the most creepy game of the year. How you laughed at those superstitious fools in the village when they warned you not to go near the old house. The climb up the rocky path under the afternoon sun was swift and within an hour you had passed through the outer gates of this once great house. The dust and cobwebs hadn't bothered you as you climbed the old stairs to the towers on the top level. Did you notice how low the sun had fallen before the sounds of locks clicking reached your startled ears? How can the moon be out already and what's that moving towards you??? This all action game will have you ducking and diving from the GHOSTS and ZOMBIES, and matching wits with a MUMMY, WEREWOLF, and VAMPIRE. 5 floors full of odd CORRIDORS, BROKEN FLOORBOARDS, and riddled with SECRET PASSAGES await you. Superb sound effects and graphics. Can be played using either keyboard or joysticks. Top table. Pause option.

EARLY YEARS (B)(E) For children between 3-6 years of age. These two packages give an adult or older child a means to take a younger child through a series of simple game type tasks to enforce ideas. The emphasis is on learning through fun. Topics covered include subtraction, addition, recognition, colour, shapes, sizes, sounds/notes, co-ordination, distances, estimates, directions.

EARLY YEARS 1
A) MICKEY THE MONKEY and his apple tree make subtraction fun.
B) COLOUR BLOCKS bring sizes and colour into perspective.
C) MERRY MUSIC turns the keyboard into a musical keyboard.
D) FUNNY FACES presents a line up, which one is the suspect?
E) FRED THE FROG needs co-ordinated help to get across the pond.

EARLY YEARS 2
A) THE POND seems very active today
B) SPEED is required to keep the cake on the conveyor belt.
C) DIRECTIONS seem to be needed by everyone in Orion village.
D) ORDER the blocks.
E) SID THE SPIDER needs some help to get out of the maze.

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A STAR IS BORN

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PACE
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AN ESSENTIAL UTILITY ROM FOR THE BBC MICRO
PACE

COMMSTAR

PRESTEL, MICRONET, BBC to BBC file transfer, Terminal Emulation.

Commstar is unique and complete, a total solution.

Imagine, a single Eprom-based package of sophisticated communications software that caters for all your requirements.

Imagine Commstar

Take for example British Telecom's Prestel service offering access to a multitude of up-to-the-minute information pages, world news or weather and much more. Instant access to Micronet 800 with many free programs that can be downloaded in seconds, free advice and news. Expand your horizons and find out just how versatile our computer can really be!

How many times have you wanted to get a copy of a program to a friend or a business colleague, quickly? With Commstar you can transfer a file of ANY type, between two BBC's (which may be thousands of miles apart), in the space of a phone call.

It really is that simple!

Commstar is 'intelligent'. It offers many advanced features to ensure simple and effective communication with the remote system.

Consider the following features.

Prestel Mode

Prestel mode features full colour Prestel graphics including double height and flashing characters. Full Telesoftware capability is offered allowing the many free programs offered by Micronet 800 to be downloaded into your computer. Pages of particular interest may be 'marked' for later retrieval and display. Page images may be copied and saved to a file on the current filing system.

Terminal Mode

In terminal mode all input may be copied into a buffer in memory or spooled directly on to disc. Full control over buffered data is provided allowing it to be listed to screen or printer, sent to the RS423, saved to or loaded from the current filing system (including TAPE).

Commstar allows full configuration and easy control over the protocols used. Send and receive baud rates, word length, parity and number of stop bits are selected from a simple table of options.

When in chat mode (80 or 40 column), characters transmitted by the host will be displayed on the BBC screen and characters typed on the BBC will be sent to the host.

Commstar allows ANY type of file (not just ASCII) to be transferred 'safely' using XMODEM protocols. In fact, four individual methods of transmission are provided for within Commstar giving great flexibility.

Using a disk based 'emulation file' Commstar can be configured to emulate virtually any terminal type including VT100, within the capabilities of the BBC.

In addition to the above, most MOS commands can be executed from within Commstar, errors are trapped by Commstar's own error-handling routines and an optional elapsed time clock may be displayed. Data filter, Local Echo, Auto-line-feed, printer on/off and XON/XOFF protocols may be toggled in or out by a single key press, extensive use being made of the function keys.

Finally, Commstar may be fitted into any of the sideways ROM sockets and is provided with a comprehensive manual.

£34 inc. VAT & Carriage.

TOOLSTAR

A revolutionary new approach to program development aids.

Toolstar is a powerful new utility Rom that will open up a whole new world for BBC micro users. *Toolstar* adopts a revolutionary new approach to program development aids. It has been designed specifically to assist both Basic and Machine code programmers by providing an integrated set of powerful building blocks which rapidly become an indispensable complement to the built in facilities of your BBC micro.

This package contains the *Toolstar* firmware in Eprom and a very comprehensive manual (over 150 pages), containing many examples and illustrations to help you make the best use of *Toolstar's* exciting capabilities.

Toolstar sheds new light on your BBC micro

Toolstar, being Eprom-based will be permanently resident in your computer allowing all of its commands to be immediately available. It is 'transparent' to both the user and the operating system; once a command has been executed, control is returned to Basic, or whichever ROM had control prior to the command.

Full error handling has been incorporated and for new users there are full help menus describing each command and its syntax.

Powerful building blocks for Basic programmers?

Within *Toolstar* there are 22 commands, 8 of which operate between PAGE and TOP ie. on the current Basic program or Basic programming environment. These commands obey standard Basic command syntax rules.

Reveal the deepest secrets of your discs

Toolstar allows the operations of Formatting, Verifying, reading or writing a disc sector to be carried out very simply from Basic i.e. all the necessary building blocks required to develop a comprehensive set of disc utilities, simply and effectively.

Lost your memory? – No more amnesia with Toolstar!

In addition to the commands described above there are 9 commands which operate on the whole of the BBC's memory and are designed to complement the BBC's built-in assembler. These include a full feature dissassembler and memory dump, each with forward and reverse scrolling.

If this is not enough *Toolstar* can be Extended!

There are three help menus on Toolstar which may be obtained by typing HELP TOOLS, *HELP MCODE or *HELP EXTEND. The third option menu will intially display the following

```
*HELP EXTEND
EXTEND <RAM adds>
```

i.e. typing *EXTEND <address> will allow the user to extend the facilities of *Toolstar* with routines which are supplied by himself. The manual describes fully how this operation is carried out and illustrates it with several examples.

In the future such utilities will be made available on disc and cassette from Pace, thus allowing a comprehensive library of utility programs to be built-up.

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GRIDMAN

Steer Sid around the grid and beware of ferocious Dyllon

By RUSSELL BASSETT

GRIDMAN is a simple yet action-packed game that promises hours of enjoyment for the whole family.

The object is to gain points by guiding Sid round a grid, filling in the squares you cross. You win 10 points for each square filled.

However you haven't got things all your own way. You have to avoid Dyllon, the grid monster.

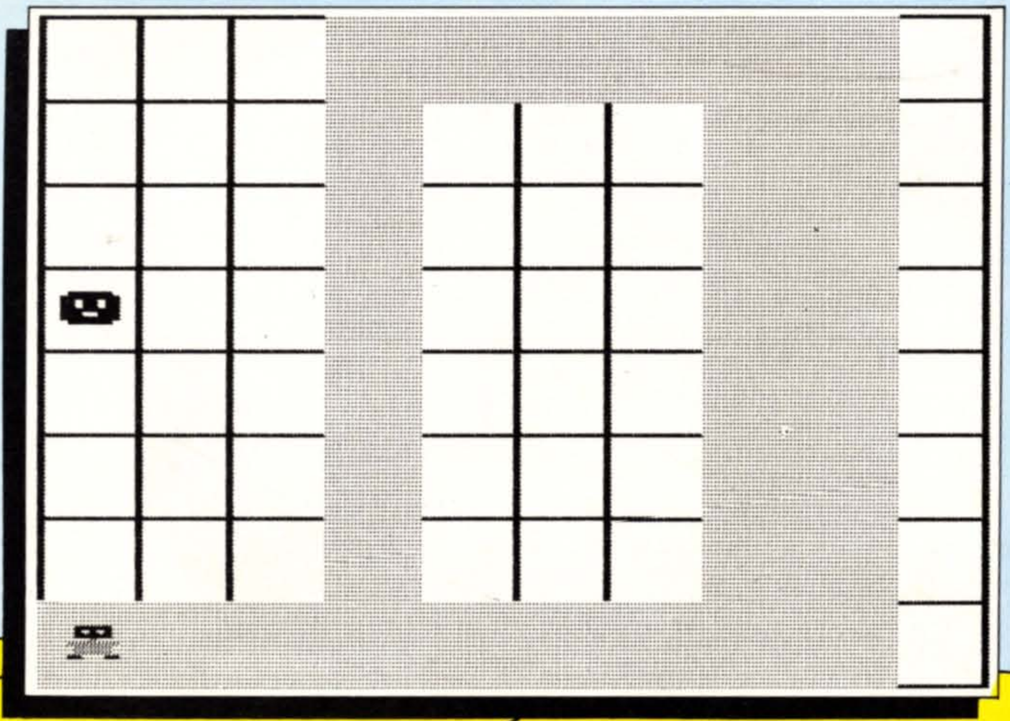
When you have covered all 80 squares you are transported to another grid where Dyllon attacks with even greater ferocity.

At the start of each game you are asked for a skill level. This can be a number from 2 to 16, 2 being the hardest.

The controls are:

Z left X right
* up ? down

One last word of warning. Very occasionally Dyllon becomes invisible – to make the game even harder!



PROCEDURES

PROCGRID	Draws grid.
PROCPMAN	Puts Sid on screen.
PROCPMON	Can either place Dyllon on the screen or erase him.
PROCFILL	Fills in a square blue when Sid leaves it.
PROCMAN	Controls Sid's movements and scoring.
PROCSCORE	Displays score and number of sheets.
PROCMON	Controls Dyllon's movements.
PROCDEAD	Gives a "you're dead" noise, and then asks whether another go is required.
PROCSHEET	Alters some variables and makes an ascending noise.
PROCINSTRUCT	Prints the instructions.

PROGRAM STRUCTURE

Lines	
50	Turns cursor off.
60-100	Defines Sid and Dyllon in strings.
110	Sets up bell sound envelope.
120	Allows skill selection.
140-190	Sets up the variables and updates the screen ready for the game.
200-240	Main game loop.
260-1450	Covers the various procedures.

VARIABLES

MAN$	Defines Sid
MON$	Defines Dyllon
SKILL	Skill levels.
SCORE	10 points per small square plus sheet to sheet addition.
SHEETS	Number of grids (complete) filled in.
X,Y	Sid's coordinates.
MX,MY	Dyllon's coordinates.
FILLED	Number of squares filled in the current grid.
X%,Y%	General variables.
XX,YY	Substitutes coordinates for Sid and Dyllon to retain their positions within the grid.
DI	Direction of Dyllon.
I%	Loop variable.
NAME$	Author's name.
K%	Ascii value of key pressed in instructions.

Full listing starts on Page 146

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In response to our call for teachers' educational programs, JOHN SCOTT from Newport is the Isle of Wight sends us his version of "Difference Square" – a program he hopes other teachers will find as useful as he does.

Fivers sixers and seveners - it's a real gift to teachers!

Classroom Corner

DIFFERENCE Square has its origins in a mathematical exercise which I have been using for a number of years in primary schools.

The children regard it as a game, competing to see who can make the largest number of squares. They refer to the results as "fivers", "sixers", "seveners", and so on.

It is a very valuable pencil and paper activity. The drawing of the squares gives practice in counting and division, and any exercise which encourages children to do 20 to 30 subtractions and still think they are playing a game is a gift to teachers!

However there are some drawbacks. By the time you have marked 15 one tends to be a bit boss-eyed – and that's only half the class!

Of more importance is the fact that if the children want to do some serious research into the "input" numbers the drawing of the squares becomes tedious and tends to inhibit their enquiry.

The problems that the children can be asked to research are almost infinite, from the very simple, such as:

☐ *How can you make ONE square?* By putting 0s at each corner of the first square.

☐ *How can you make a TWO square?* By putting the same number (except 0) at each corner of the first square.

Then there are the very complex:

☐ *Having got a series of squares, can you build an extra square on the outside? (Try this one!)*

A few intermediate questions:

☐ Try using all odd numbers.

☐ Try using all even numbers.

☐ Try using square numbers.

☐ Try adding 100 to each of the numbers you have just tried.

☐ How many squares can you make using numbers up to 10? . . . 20? . . . 30? . . . and so on.

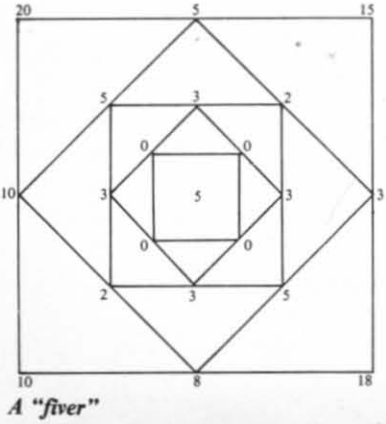
☐ Are bigger numbers better than smaller numbers? and so on.

Bearing all this in mind I felt that here was an exercise crying out to be computerised, so I made the attempt.

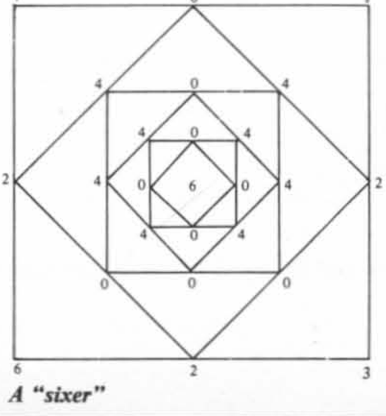
As this is my first program it may leave something to be desired in "text book programming". But it does work, the children are enjoying using it, and it has also been taken up by our county maths coordinater, who is trying it out in high schools.

I have omitted the temptation to build in a counter to count the squares as I felt that this would destroy the pleasure and excitement the children get from doing it themselves.

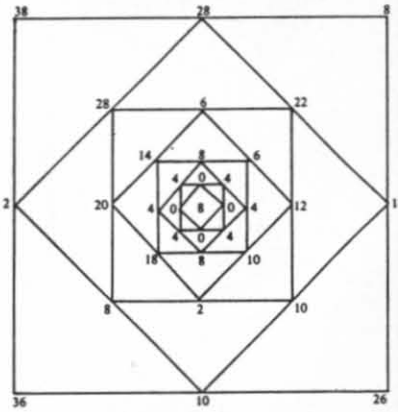
Full listing starts on Page 150



A "fiver"



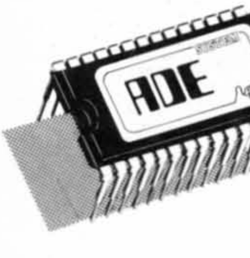
A "sixer"



An "eighter" that went wrong. An example of the value of being able to check children's work on the computer.

SYSTEM SOFTWARE

·ROMs FOR THE BBC MICROCOMPUTER·



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SPY2 includes a set of powerful disc recovery commands for interrogating, editing and retrieving data stored on a floppy disc. SPY2 also includes a disc formatter as well as a non-destructive single track reformatter.

In all SPY2 has a comprehensive set of 23 utility commands. These are supported by an excellent Reference Manual.

The SPY2 front panel encompasses all the superb, easy-to-use facilities of the renowned SPY debugging monitor PLUS additional commands for toggling and finding breakpoints; relocating machine code programs; single stepping through subroutines in one go and facilities for accessing the front panel from programs in RAM or ROM with breakpoints, OSBYTE or CTR-F.

SPY2 features a versatile disassembler with hex dump, full and intelligent disassembly. This identifies data areas in the program; these being displayed as a hex/ASCII dump. Operating system calls are labelled creating very readable code. The powerful trace facilities enable program instructions and register contents to be traced to printer whilst the program is running. Indispensable for graphics programs as they can be stepped through whilst observing the effects on the screen.

SPY2 features a disc sector editor displaying the contents of a whole sector; disc search facilities for finding byte patterns or strings and free disc space. Files may be recovered by creating a directory entry with all the data concerning the deleted file. Directory entries can be easily amended using the *AMEND command. The *FORMAT command formats discs with any number of tracks. A verify command checks discs. The *REFORMAT command is extremely useful for recovering information from a bad track, reformatting it and restoring the data. Commands are included for loading files at &1900 and automatically downloading (and running) them.

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NOT just another input routine

OH DEAR! Not another input routine? The Editor's face said it all when I saw him at the Micro User Show, but he suggested he might just be interested in this one.

Everybody has their own pet routine – not very useful, not very general – but the proof of the pudding . . .

Well now, he wouldn't be publishing it if he hadn't changed his mind, would he? For few are as versatile, flexible, and above all, useful as this one has proved to be.

When working with a database, or with any other program requiring a lot of input, a flexible input routine that allows quick and easy validation and editing of data is pretty well indispensable.

A general purpose input routine, which I have used extensively, and which allows some data validation as well as easy editing, is described here.

As demonstrated in the accompanying program, it can be used both for initial entry and subsequent modification of data fields in a database, and in option selection menus.

The routine revolves around the concept of a "data entry field" – a defined and clearly indicated place on the screen display where the current keyboard input is shown.

On calling the function FNin, with its entry parameters set appropriately (see Table I), a field is set up on the screen.

Shown as a plain white box when empty, this can be of any length from 1 to 255 characters and can be initialised with any desired string.

Any character can be typed into it, provided there is space, and that it is among those specified as valid for the field.

Anything shown within it can be edited using the cursor control keys in a logical manner to overtype, insert or delete characters.

Exit from the routine is either by pressing Return – the normal method of exit – or by pressing any of the red function keys, provided they have been enabled by a *FX225,x call, where x>&8B.

On exit, the field contents are returned as the value of the string function FNin, and the global variable £% is used to pass a return code back to the calling routine.

If Return terminated the routine, £%=0, otherwise £%=key-value (associated with the function key pressed).

On calling the function, a data entry field is created on the screen at the specified position (p%,v%). The length of the field is specified by 1%, which gives the maximum number of characters that can be contained in the field.

The total length of the field on the screen is 1%+2, as there is an initial and a final teletext control character used to highlight the field.

The initial control character is placed at p%,v%, so the first character in the field appears on screen at p%+1,v%. The field can be initialised to hold any desired string, i$.

If empty, the field is shown as a plain white box. If there is an initial value, it displaces the box to the right.

By MIKE STALLYBRASS

As characters are entered at the keyboard they are optionally capitalised (or other effect) according to the effect selected, e% (see Table II), and then checked against a set of valid characters, v$.

If the entry is valid, the field contents are then overwritten. Invalid entry is signalled by a beep from the computer.

On entering the routine, the Caps/Shift Locks are cleared by *FX202,48, but can then be reset as required from the keyboard.

The default auto-repeat period is used for character entry, but when using the cursor keys, the auto-repeat period is reduced by using *FX12,5.

The position at which the next character will overtype the field contents is shown by the flashing rectangular cursor, though if the field is full, the cursor changes to a thin flashing line.

Normally any keyboard entry will overtype the current field contents. However on changing to insert mode by pressing Shift+Up-arrow – indicated by a more rapidly flashing cursor – keyboard entry is inserted at the current cursor position. A soft beep is emitted to remind the user that a character has been inserted.

Deletions are made by using Delete, Shift+Delete, Ctrl+Delete, Down-arrow, and Copy, as explained in Table III.

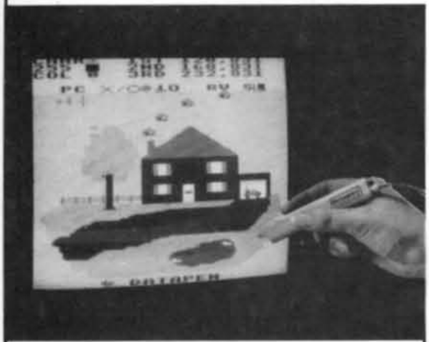
Besides the global variable, £%, the routine requires a global variable, Az$, for actioning character conversion

→

Input parameters	
p%	Horizontal tab position for field.
v%	Vertical tab position for field.
l%	Length of Field.
e%	Character conversion effect.
v$	Valid characters for input to field.
i$	Initial contents of field.
Global variables	
£%	Return code (Zero, or key value if a function key terminated entry).
Az$	Previously defined string for capitalisation control in effect 6.
Internal variables	
a$	The current field contents.
c%	The current cursor position.
f%	Character conversion (e%MOD10).
i%	Insert mode flag (–1 = insert, 0 = overwrite).
Other requirements	
*FX4,1	Must be set (to enable the cursor control keys to function).
*FX225	Should be set (to enable the function keys to terminate entry). For example, *FX225,240 gives return codes in the range 240-249.

Table I: Function requirements

Datapen BBC Lightpen Programs **Datapen**



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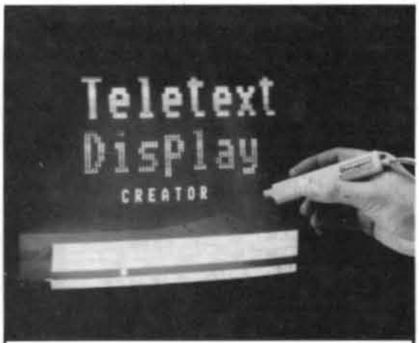

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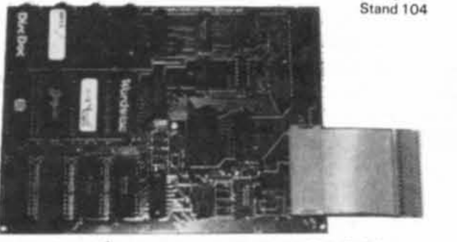

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From Page 73

effect type six. In addition, a *FX4,1 call should be made before calling the routine to enable the cursor control and copy key actions of the routine.

Before terminating the program, a *FX4,0 call should be made to restore the normal action of these keys.

Except for these considerations, the routines are completely self contained.

The main routine, FNin, invokes six further routines. PROCchar is called whenever a character key is pressed, and converts any letter according to the selected effect.

In turn, this calls PROCaddchar, which checks the character is valid and inserts or overwrites the character in the field.

Cursor control is handled by PROCarrow and PROCtab, and PROCdel handles the various actions of the delete key.

Finally, when the end of input is signalled FNcompress removes any remaining pad characters inserted when using the up-arrow key, and strips leading spaces if the appropriate effect is selected.

As written, the routine is intended for use in Mode 7. While the routine works in any mode, the screen display in other modes may be a trifle odd unless the routine is slightly modified.

The listing given here demonstrates just part of the system's potential.

e%	Is a combination of two parameters (a*10 + b), with the following effects:
	[e% DIV 10]
0	Leading spaces stripped on exit, field must not be blank.
1	Leading spaces stripped on exit, field can be blank.
2	No stripping of leading spaces, field can be blank.
	[e% MOD 10]
0	No character conversion.
1	All letters in upper case.
2	All letters in lower case.
3	All letters in case as set by shift, or shift/caps lock keys.
4	As 3, but first character in field capitalised.
5	As 4, but first letter of every word capitalised.
6	As 5, but first letter after any character not in Az$ capitalised.

In effects 4-6, capitalisation can be overridden by Ctrl-letter.

Table II: The effect parameter

Any character	Entered at current cursor position, if valid.
Return	Terminates entry. £%=0 on exit.
Function keys	Terminate entry, £%=key-value on exit.
Left/right arrows	Move cursor left/right.
TAB	Moves alternately to start/end of field.
Up-arrow	Inserts a pad character at the cursor.
Down-arrow	Deletes character at the cursor.
Shift+Up-arrow	Sets insert mode on.
Shift+Down-arrow	Cancels insert mode.
Delete	Deletes character preceding cursor.
Shift+Delete	Deletes from cursor to end of field.
Ctrl+Delete	Deletes entire field.
Copy	Restores original entry.

Table III: Key definitions

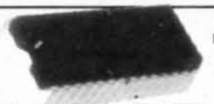
Input Routine listing

The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

```
 10 REM *** GENERAL PURPOSE INPUT
     ROUTINE ***
 20 REM *** Demonstration Program
     ***
 30 REM *** M.STALLYBRASS 1984
     ***
 40 REM *** (C) MICRO USER 1984
     ***
 50 MODE 7
 60 *FX4,1
 70 *FX225,240
 80 Az$="QWERTYUIOPASDFGHJKLZXCVBNMq
    wertyuiopasdfghjklzxcvbnm"
 90 ANY$=Az$+" 1234567890-@;:,./!£$%
    &'()0=~+*<>?"
100 FOR I%=0 TO 6
110 PRINT TAB(0,2+I%) CHR$ 134;
    "Effect "+STR$ (I%)+" =>"
120 b$=FNin(15,2+I%,12,I%,ANY$
    ," Hello "+STR$ (I%))
130 NEXT
140 PRINT TAB(0,12) "Enter an intege
    r"
150 PRINT TAB(0,13) CHR$ 133; "Value
     is"; CHR$ 129; VAL (FNin(10
    ,13,10,10,"1234567890+-",""))
160 PRINT TAB(0,15) "Enter any numbe
    r"
170 PRINT TAB(0,16) CHR$ 133; "Value
     is"; CHR$ 129; VAL (FNin(10
    ,16,10,11,"1234567890.E+-"
    ,""))
180 PRINT TAB(0,19) "Enter selection
     (A or B)"
190 A%=ASC (FNin(25,19,1,1,"AB"
    ,""))-64
200 ON A% GOTO 210 , 220
210 PRINT TAB(0,20) CHR$ 130"Selecti
    on A"
    : GOTO 230
220 PRINT TAB(0,20) CHR$ 131"Selecti
    on B"
230 PRINT TAB(0,22) "Finished"
240 *FX202,32
250 *FX4
260 *FX225,0
270 END
280
290
300 DEF FNin(p%,v%,l%,e%,v$,i$)
310 REM ========================
320 LOCAL a$,c%,f%,i%
330 *FX202,48
```

Turn to Page 170

A little bit of magic from



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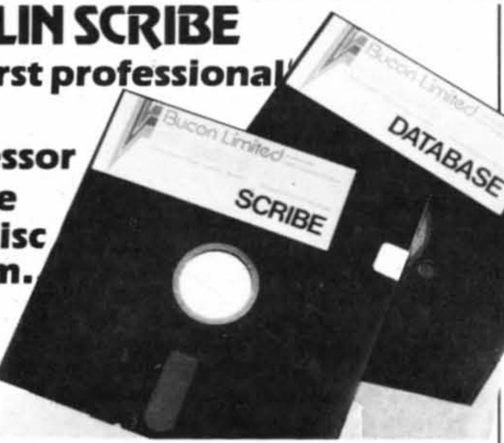

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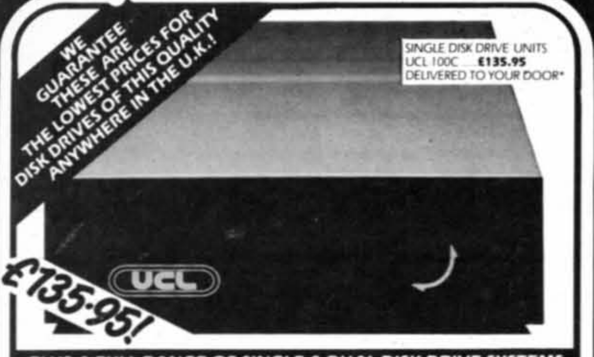
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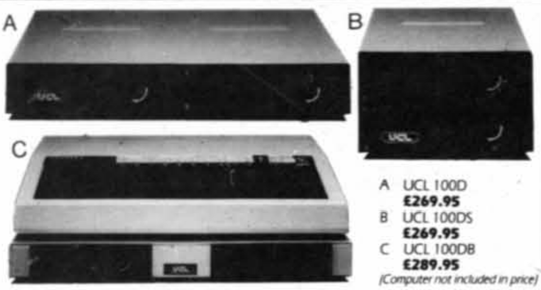

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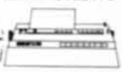

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Go for a scroll across your screen...

ALAN PLUME demonstrates the technique of moving screen contents up, down – or even sideways

SCROLLING is the movement of all the contents of the screen in some given direction. At its best, it's the technique that makes games like Fortress or Defender what they are.

At a simpler level it can be an up/down movement achieved a character line at a time by use of cursor movement.

VDU 30 homes the text cursor to the top left of the text window.

VDU 11 moves the cursor up one line.

Thus **VDU 30,11** will scroll the screen down one line.

VDU 31,39,24 moves the cursor to the bottom right of the full Mode 7 screen.

VDU 10 moves the cursor down one line.

Thus **VDU 31,39,24,10** will scroll the screen up one line.

Although fairly crude, even this can make some screen displays very effective. Text can be scrolled sideways with a fairly complex string-handling program, but for finer control life is not so easy.

Consider a Mode 2 screen, which takes up to 20k of memory. If we want to move it sideways by software it will take some time, even with a very efficiently written piece of 6502 machine code.

Fortunately the 6845 display controller comes to the rescue once again. In an article in the December issue of *The Micro User* I showed that reasonably fast animation can be achieved on the BBC Micro by using "page switching".

This involved, simplisticly, just changing pointers to the beginning of two separate areas of user RAM. If these pointers are incremented or decremented by a small amount, and some extra care is shown, the screen can be continuously scrolled up, down, sideways or diagonally.

The registers we need to write to in the 6845 are numbers 12 and 13. The values that we need to write are the start address of the screen divided by 8, although for Mode 7 things are a little more complicated.

Register 12 contains the high byte, register 13 the low byte. Thus for the normal start of Mode 2 they should contain:

```
reg 12 =(&3000 DIV 8) DIV 256
reg 13 =(&3000 DIV 8) MOD 256
```

Values can be simply written to the writable 6845 registers by using the command:

```
VDU 23;register no.,value;0;0;0;
```

Incrementing the screen start address by 8 will move the whole screen left by one 6845 character position. These are different to the normal number of characters per line.

In Modes 0 to 3 the 6845 has 80 characters, and in Modes 4 to 6 there are 40.

Care must be taken when moving a screen to ensure that the start and end addresses are never outside of the "official" screen area. For Modes 0, 1 and 2 this is &3000 to &7FFF (see lines 190 and 200 of Program I).

In Program I the start address is incremented by either 648 or 632. An increment of 640 will move the screen up one line so these values will cause the graphic to move diagonally left or right and up. Pressing Space changes the direction.

A good place to start experimenting with this program is to alter the values of *inc%* in lines 130 and 240. Try:

```
130 inc%=8
```

and

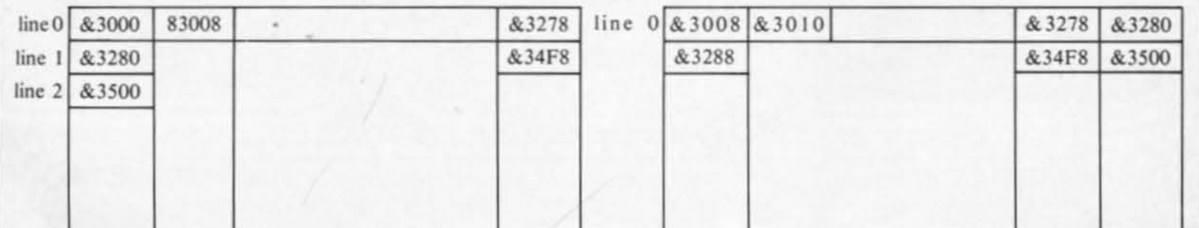
```
240 IF inc%=8 THEN inc%=-8 ELSE
inc%=8
```

Users with OS 0.1 must remove line 280.

If you use Program I to scroll sideways (*inc%*=8) you will notice that as the screen "wraps round" it will reappear either one line up or one line down from its original position.

This can be resolved by moving the bytes on one side of the screen up or down one character position. Obviously this should be written in machine code for speed.

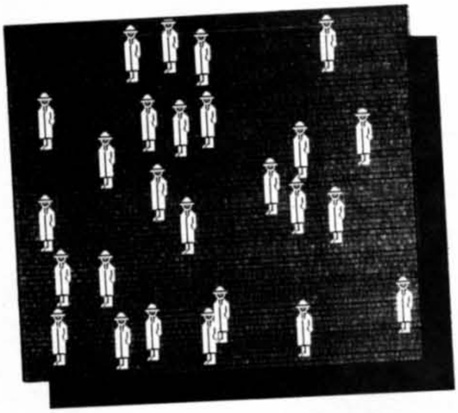
Figure I shows two diagrams indicating the screen memory map for Mode 2 before and after a single 6845



Memory map of screen before scrolling

Memory map of screen with screen start = &3000 + 8

Figure I: Mode 2 memory map before and after scrolling



character sideways scroll has been executed.

You can see that the movement of screen memory needed to solve the above problem looks reasonably simple and only one involves moving 256 bytes (one column) at each one character scroll. However other complications arise.

Finally here's a little offering, simple but effective, that shows hardware scrolling off nicely. It's raining men, hallelujah . . .

```
    5 REM PROG I
   10 MODE2
   20 VDU23;8202;0;0;0;
   30 screen%=&3000
   40 FORI%=1TO7
   50 COLOURI%
   60 PRINTTAB(5,10+I%)"MICRO USER"
   70 NEXT
   80 MOVE280,400
   90 PLOT1,720,0
  100 PLOT1,0,320
  110 PLOT1,-720,0
  120 PLOT1,0,-320
  130 inc%=648
  140 REPEAT
  150 REPEAT
  160 PROCreg1213
  170 start%=screen% DIV8
  180 screen%=screen%+inc%
  190 IF screen% >= &8000 THEN screen
% = screen% - &5000
  200 IF screen% < &3000 screen% = sc
reen% + &5000
  210 REM
  220 REM Pressing the SPACEBAR will
alter direction of motion.
  230 UNTIL INKEY(0)=32
  240 IF inc%=648 inc%=632 ELSE inc%=
648
  250 UNTIL FALSE
  260 DEFPROCreg1213
  270 start%=screen% DIV8
  280 *FX19
  290 VDU23;12,start% DIV256;0;0;0;
  300 VDU23;13,start% MOD256;0;0;0;
  310 ENDPROC
```

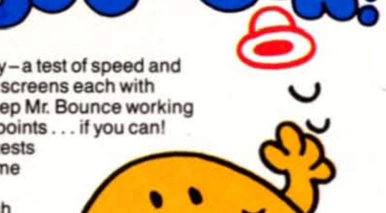
Program I

```
   10 REM PROGRAM II
   20 MODE1
   30 VDU23;8202;0;0;0;
   40 VDU19,2,4;0;
   50 PROCdefchars
   60 GCOL0,130:CLG
   70 VDU5
   80 FOR man=0TO25
   90 READX%,Y%
  100 PROCputman(Y%)
  110 NEXT
  120 VDU4
  130 PROCscroll
  140 END
  150 DEFPROCputman(Z%)
  160 OY%=Z%
  170 GCOL0,0
  180 S%=224
  190 FORT%=0TO1
  200 FORJ%=1TO5
  210 MOVEX%,Z%:VDUS%,S%+1
  220 Z%=Z%-32:S%=S%+5
  230 NEXT
  240 GCOL0,3
  250 S%=226
  260 Z%=OY%
  270 NEXT
  280 ENDPROC
  360 DEFPROCscroll
  370 screen%=&3000
  380 inc%=640
  390 REPEAT
  400 S%=screen% DIV8
  410 *FX19
  420 VDU23;12,S% DIV256;0;0;0;
  430 VDU23;13,S% MOD 256;0;0;0;
  440 screen%=screen%-inc%
  450 IF screen% >= &8000 screen% = s
creen% - &5000
  460 IF screen% < &3000 screen% = sc
reen% + &5000
  470 UNTIL FALSE
  480 ENDPROC
  490 DEFPROCdefchars
  510 start=224
  520 FORrow=1TO5
  530 FORchar=start TO start+3
  540 VDU23,char
  550 READ A$
  560 FOR pos=1 TO 15 STEP 2
  570 VDU EVAL("&"+MID$(A$,pos,2))
  580 NEXT
  590 NEXT
  600 start=start+5
  610 NEXT
  620 ENDPROC
  630 DATA0E1F3F00FF2A2411
  640 DATA00008000E0B0B000
  650 DATA0000003F00151B0E
  660 DATA0000008000000000
  670 DATA1F143575F5FBF7F7
  680 DATA00B0C0E0F0F0B0B0
  690 DATA000B0A0A0A040808
  700 DATA0000000000004040
  710 DATAF7F7F7F7F7F7F7F7
  720 DATAB0B0B0707070A0C0
  730 DATA0808080808080808
  740 DATA40404080B0B04000
  750 DATAF7F7F7F7F7F7F7F7
  760 DATAC0C0C0C0C0C0C0C0
  770 DATA0808080808080808
  780 DATA0000000000000000
  790 DATA001B1B1B1B136FDF
  800 DATA00B0B0B0B0B0B0B0
  810 DATA1F04040404 0C1020
  820 DATAB000000000000000

  830 DATA100,200,120,370,80,530,96,8
20
  840 DATA300,180,260,360,280,700
  850 DATA 380, 1000, 420, 800, 440,
600, 400, 200
  860 DATA 500, 1020, 520, 780, 530,
500, 580, 180
  870 DATA 600, 980, 610, 800, 800, 6
00, 620, 240
  880 DATA 1000 ,1000 ,900 ,700 ,880
,540 ,880 ,190
  890 DATA1200 ,240 ,1000 ,510 ,1100
, 730
```

New from MIRRORSOFT

Watch out for HI BOUNCER!



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Alice through the VDU

Our monthly foray into Adventure games

Try sinking your teeth into this vampire voyage

VAMPIRE Castle by Micrograf must have Bach turning in his grave. It features event music and loads to the strains of the maestro's Toccata and Fugue in D minor which is replayed almost everytime you foul up.

Don't play it with anyone else in the room as the jeers of derision quickly turn to groans of pain. You must either disconnect the speaker or key in *FX210,1 to avoid real injury.

As the program says: "You've guessed it. Count Drac's back!" and it should take experienced vampire hunters just past midnight to put the stake in.

In the meantime you will have been guillotined, beaten to death, fried, blood sucked, had your brains smashed, your throat torn out and fallen screaming umpteen times into the moat, usually to the strains of the third movement of Chopin's Piano Sonata number 2 in B flat minor – the Marche Funebre.

Some of these fates can be avoided and most of the answers obtained from a listing. But then you miss many of the animated graphics and sound effects that make this program worth playing.

The author, Andy Mitchell, has obviously played Castle of Riddles and has written an equally well structured program which forces you to wear objects and then, oddly enough, breaks when you try to WEAR HANG-GLIDER.

I had four main problems playing this game fairly – where to dump my POSSESSIONS so I didn't lose them when the bell tolled midnight, how to get the crucifix without being beaten to death, how to get the garlic without being zapped, and how to make Dracula appear.

The last problem was the most difficult because the program has a move counter and I got to the vault with plenty of time to spare.

I had to pass the time with D for DOWN. The bats flew around the screen, the sun came up and the bell DONGed midnight a number of times before I finally got him under the hammer. I'm surprised I stayed awake that long.

There are about 45 rooms, 17 objects, 21 verbs plus a dozen amusing sound and animated graphics effects which make it ideal for beginners and kids.

My only real complaint is that, after being guillotined, it really should play the Marche au Supplice from the fourth movement of Berlioz's Symphonie Fantastique.

More experienced players will also enjoy it because they can try solving it in the minimum number of moves. By that I mean waiting moves – like saying D when you know you can't – don't count. Why don't more games have move counters?

Another game by the same author is Flint's Gold. I'm surprised this isn't sold with a copy of Treasure Island because it sticks to the spirit of the original very neatly and it's a far better story than The Hobbit.

Once again it's great for kids but experienced players should get the treasure chest in even less time than pegging Dracula.

Having to mix with this scurvy, murderous crew only encouraged me to cheat my way past the first appearance of Flint's ghost – alchoholics beware – to get the piece of metal.

Most of the other problems I played fair but I couldn't fathom how to get the key because Long John Silver always seemed to stay out of my line of fire. Incidentally he has a quite remarkable wooden leg because he could even stand

‘. . . you will have been guillotined, beaten to death, fried, blood sucked, had your brains smashed, your throat torn out and fallen screaming into the moat’

From Page 81

beside and behind me when I was swimming in the lake.

My only complaint is that Ben Gunn actually preferred cheese, but the bell does toll rather too quickly for the poor old goat's milk to curdle.

Once again you'll be driven up the mast by the music – this time the Sea Shanty so beloved by the Last Night of the Proms. So, Jim lad, don't forget to *FX210,1.

Both these programs have a clear, unrandomised story and objective which is the real reason they are only moderately difficult.

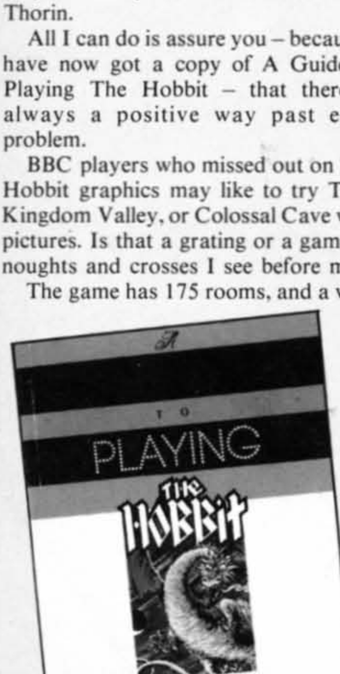
Programs I haven't solved are The Hobbit (Melbourne), Twin Kingdom Valley (Bug Byte) and The Wheel of Fortune (Epic). All three are graphical, all three involve a kind of D&D battling with odd characters and all are riddled with random numbers "so each adventure is different".

Well I'm afraid that random doesn't mean interesting to a number of readers, particularly those who have found it tiresome waiting to get out of The Hobbit dungeon only to be stuck straight back in the slammer. Obviously they need help. But don't ask me, ask Thorin.

All I can do is assure you – because I have now got a copy of A Guide to Playing The Hobbit – that there is always a positive way past each problem.

BBC players who missed out on The Hobbit graphics may like to try Twin Kingdom Valley, or Colossal Cave with pictures. Is that a grating or a game of noughts and crosses I see before me?

The game has 175 rooms, and a very neat trick, for those who get fed up waiting for the pictures to be drawn, is that it only draws a location the first time you reach it.



Hit a key, or revisit a room, and you get a text description plus any objects in the room.

The pictures are drawn quickly with some clever screen fill code. To begin with I hardly bothered to draw a map or solve any problems. I just wandered randomly looking at the views – a bit too much red for my taste.

Actually you can't wander for very long before being involved in a fight with some wierdo wielding an axe or club and getting killed. You then have to read the instructions carefully to avoid loading the whole program again. Even then it took me a while to work out that 'SAVE is really *SAVE.

Like Colossal, the object and flavour of the game is to collect all the treasures, amass 1,024 points and then see what happens. So far I've only seen about 70 rooms and am having trouble with the dragon in the Desert King's Castle. So don't ask me what happens at the end.

I have mentioned The Wheel of Fortune before. This program is in machine code with 250 rooms, multiple high level commands, graphics and interactive characters. The rooms are drawn very quickly in the top half of the screen and the text scrolls underneath.

One interesting command is CONTINUE, which whizzes you along straight roads or down ropes until you can't go any further.

You can enter very complex commands like: "Pick up the axe, saw, hammer and spade then take the lamp and light it". But you quickly find that any error, like there is no axe around, causes the program to ignore the rest of the sentence.

I must confess to being a reactionary verb/noun player – unless I have a choice of what to hit the interactive characters with – so no great hints here either. It's me who needs help.

The object of the game is to recover the wheel from the bottom of a well. Like The Hobbit, the characters freewheel and interact. That is, their behaviour depends on how nice you are to them. So I gave the beggar a penny and he poisoned me.

I think Epic would do better if they gave more hints and explanations for this game like the booklets that Level 9, Salamandar and Melbourne provide.

Alice,
The Micro User,
68, Chester Road,
Hazel Grove,
Stockport SK7 5NY

I HAD a number of letters telling me to use the rucksack and wear my woolly underwear in Lords of Time. This saves me having to browse through magazines in the bookshop looking for clues.

As regards help – Philosophers Quest by Acornsoft seems to cause the most problems. Where is the dog? How do I get rid of the albatross?

To forestall some of these – and other Acornsoft problems – LOAD these programs and have a look at them.

You will notice that P.Q. has 299 messages called by PROCM so:

```
FOR I% = 1 TO 299: PRINT I%:
PROCM(I%) : NEXT
```

can be most enlightening.

This won't, however, help you to solve the mazes but I'll deal with those if I get any answer to the trap door maze puzzle I set in May. Some people have found the pathword for the Pirate's Maze in Colossal incomprehensible. Try:

GPMMPX.UIF.QBUI.F.OX.TF.O

Some can't even find the maze. It's west of the chasm, then south. But you have to wait until you have been mugged before the chest appears.

Level 9 games also cause a number of queries and Snowball produced the most difficult. "Why do I spend all that time and effort mending the snowdozer when it then trundles off without me?"

I confess I am totally baffled.

Only one reader has replied to my coded solution of how to get the chest in the Pirate's Maze.

Dr Patricia Pay quite rightly pointed out that you can get there in four moves, therefore it can easily be solved with the four objects you are allowed to carry.

My solution was for the original Colossal, where the path was at least seven moves deep, but it still works.

Dr Pay has also spent some time on the Captive game in Ian Watt's book Creating Adventure Games – reviewed in the February edition of *The Micro User* – and says that it is possible to beat the author's 62 move solution.

She actually got it down to 45 moves and found it an interesting, informative exercise. The reason is that the program has a bug which requires a clear understanding of the game to utilise and then rectify.

Even when corrected it is still possible to solve the game in 60 moves. **Alice**

Don't get your bell ropes in a twist

THIS month's Micro User Adventure is called A Tangled Tale. Again, random numbers are used to create the problem and hide the solution.

Despite this let me assure you that it is always possible to solve the problem, unlike some games I could mention.

As you probably know, Quasimodo was not deafened by playing Micrograf games but because he used to play the bells with his feet. The ropes are all lying disconnected in the belfry and your task is to identify which rope is which down in the vestry and then pull them in the right order.

The only commands you need are UP, DOWN, TIE and PULL. Note that the program prompts on TIE and PULL. It's a rotten technique but it keeps the parser simple.

I very much doubt that one in a thousand can solve this problem, so it really isn't very suitable for an Adventure unless the number of ropes is only three or four.

```
   2 CLS
   5 DIM A(10),B(10),U(10),D(10)
  10 ON ERROR GOTO 130
  20 M=0
  30 B=0
  40 N=3
  50 FOR I= 1TO N:A(I)=0:NEXT I
  60 FOR I=1 TO N
  70 E=RND(N)
  80 IFA(E)>0 THEN 70
  90 A(E)=I
 100 B(I)=E
 110 NEXT I
 120 GOTO270
 130 PRINT"You can't do that"
 140 INPUT"What now ",V$
 150 V$=LEFT$(V$,1)
 160 IF V$<>"D" THEN 250
 170 IF F=0 THEN 130 ELSE M=M+1
 180 IF M=3 THEN PRINT"Quasimodo tie
s the ";N; "ropes to the ";N;"bells"
 190 PRINT"You are in the vestry.";N
;" ropes hang from the ceiling"
 200 F=0
 210 FOR I=1 TO N
 220 D(I)=0
 230 NEXT I
 240 GOTO140
 250 IF V$<> "U" THEN 330
 260 IF F=1 OR M=3 THEN 130 ELSE M=M
+1
 270 PRINT"You are in the belfry.";N
;" ropes lie on the floor"
 280 F=1
 290 FOR I=1 TO N
 300 U(I)=0
 310 NEXT I
 320 GOTO140
 330 IF V$<>"T" THEN 420
 340 INPUT"Tie which two rope ",R1,R
2
 350 IF F=0 THEN 390
 360 U(A(R1))=A(R2)
 370 U(A(R2))=A(R1)
 380 GOTO140
 390 D(B(R1))=B(R2)
 400 D(B(R2))=B(R1)
 410 GOTO140
 420 IF V$<>"P" THEN 130
 430 INPUT"Pull which rope ",R
 440 IF M=3 THEN 490
 450 IF F=1 THEN X=D(R) ELSE X=U(R)
 460 IF F=1 THEN D$="down" ELSE D$="
up"
 470 IF X=0 THEN PRINT"Nothing happe
ns" ELSE PRINT"Rope ";X;" moves ";D$
 480 GOTO140
 490 FOR I = 1 TO B(R)
 500 PRINT"Bong!"
 510 NEXT I
 520 B=B+1
 530 IF B(R)<>B THEN PRINT"Quasimodo
 knocks 7 bells out of you!":STOP
 540 IF B=N THEN PRINT"Quasimodo giv
es you a gold ring":STOP ELSE 140
```

Those ready for Judgement Day..

MY thanks to Gabriel White for the following response to the Judgement Day Puzzle in the April edition of *The Micro User:*

"Being perfect, I enter 28
Ah, the safe is open – now to choose a weight
Clearly I need 1lb so 1lb let it be
And for the next, it's obvious – I must have number 3
9lbs is the next one and, if I hope for heaven,
My fourth and final choice must be number 27.
Now I can obey the sign, whate'er it indicates
Heaven, here at last I come! open Pearly Gates!"

Alas poor Gabriel couldn't open gates when zero was required. She should look closely at line 10 to see where she misfired. Nor did she go through the purgatory of opening the aliquot safe when the number is 14316.

Now a perfect number is the sum of its aliquot divisors, that is:

1+2+4+7+14=28

but 14316 is an amicable number – the sum of its aliquots=19116 and, repeating the process, you don't get back to 14316 until 28 numbers have been entered. To see the program doing this, dummy line 100 and replace line 150 with:

PRINT "click"

but don't hold your breath as it takes this very inefficient program over an hour to calculate the 28 numbers.

The first person to solve all the problems was S.R. Chmiel of Lichfield, and I hope he finds his prize a suitable fate worse than death.

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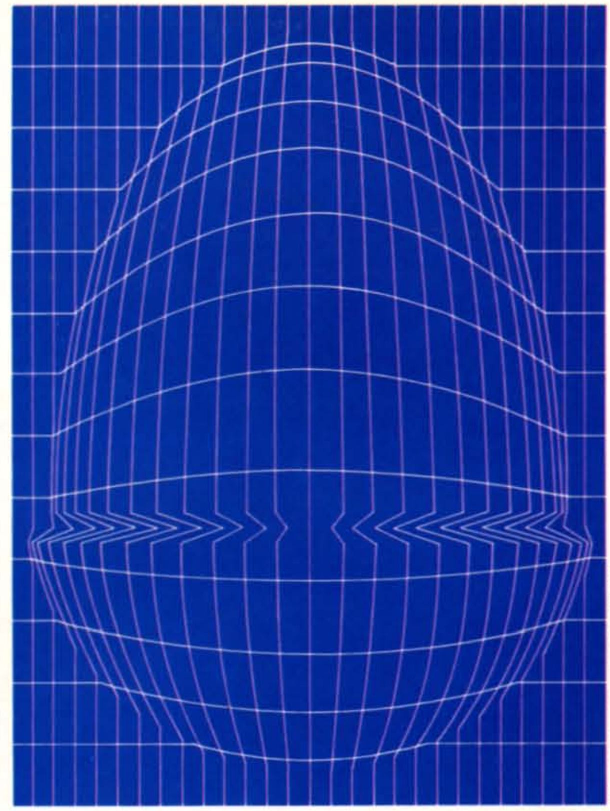

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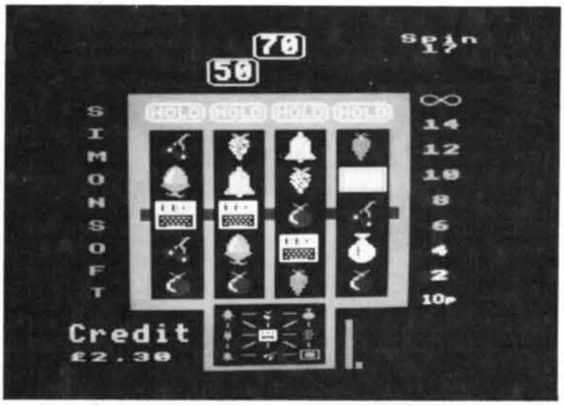

Take a spin on a one armed bandit

I'VE always wanted to gamble recklessly and not be in the slightest danger of losing money. So when the opportunity came to review **Superfruit** by Simonsoft, I jumped at it.

I haven't played another version, so I've nothing to compare it with. But if this one is anything to go by, the pastime of micro gambling could catch on, at least in our house.

The screen format is what you would expect, with the machine's main window taking up a large percentage of the screen.

On the press of the space bar, a variety of the usual cherries, grapes, apples and strawberries, with additional items such as money bags, BBC Micros and the ever popular bars and bells, roll through the three windows.

As with the mechanical version, certain combinations pay more than others and these variations are displayed while the program is loading.

Just below the main window is another window which contains a 3 × 3 grid of each of the items on the rollers.

As each item appears on the winning line of the main window, its replica lights up in the second window, the object being to achieve as many lines of three as possible in order to gain a proportionate number of "nudges".

These nudges are displayed in a column on the right hand side of the screen.

You start the game with £2 – displayed as a pile of coins. Each gamble costs 20p and your pile decreases or increases according to your luck.

It very quickly tells you that you are SKINT! and rubs it in with a persistent little tune.

There is the usual random hold facility which works on the main screen only.

The nudge window has its own random hold facility which enables you to increase your nudge count – but this rarely appears.

In addition to your 20p turn, you can gamble any win and any nudge allocation. Every gamble option is displayed on the screen along with the option not to gamble your well earned bonus.

I recall sitting there on several occasions highly excited as I gambled a non-existent £2 jackpot for double or quits.

I inevitably ended up losing every penny but here the game adds one extra little touch. Displayed on the screen all the time is your spin count so you can compare how you fared in one game with another.

This is truly a most entertaining piece of software, certain to be played for hours irrespective of age – or financial standing.

David Andrews

Make micro music

ALTHOUGH I have a fairly good musical ear and can just about cope with the piano and guitar, I have never actually sat down and composed anything.

However, the idea really appealed to me when I was asked to review **The Synth** by Musicsoft.

When I first loaded the program I was a little dismayed by the number and length of on-screen instruction pages to be read in addition to the small instruction manual.

Nevertheless I read every word and complied with the contents. If you don't want your first experience of Synth to be disappointing, I suggest you do the same!

The program recommends you don't try to write your "magnum opus" the first time at the keyboard, so I settled for something simple.

Full credit to Musicsoft. The first thing the program allowed me to do was to make a backup copy – on disc in my case – with its own built in routines. Very commendable.

Once my copy was loaded, I was able to select which of the four channels – including the noise channel – I wanted to record.

Not wishing to be too adventurous on my first expedition I chose channels one and two.

A menu of eight options was next displayed on screen:

Record a tune enables you to play up to a preset number of notes by the use of an on-screen piano keyboard using the top two rows of keys.

Replay allows you to hear what you have just recorded on a particular channel, and *Alter Rhythm* allows you to replay your piece in an alternative rhythm using a single key.

You can also Replay all the channels at once.

Alter Speed changes the tempo of the whole composition, and *Input Repeats* allows you to repeat complete sections of music. It is a bit tedious to implement but it can save time later.

Load and *Save* are self explanatory, and finally *Tidy* is of great assistance if your rhythm is not too good. It gets rid of all but gross inaccuracies by lining up all channel rhythms with channel one.

I quite enjoyed my first introduction to The Synth, and I'm sure that with a little more practice I could become quite proficient in the art of "Micro-composition".

It would be quite entertaining to enter in pre-written music from script and playing it at a variety of speeds with different rhythms.

At £8.75 it is good value for money, virtually guaranteeing hours and hours of musical merriment.

Eat your heart out Lloyd Weber – the BBC Micro musicians are on their way!

Brian Livesey

Who'd be a bank manager?

AS the manager of a multi-storey bank, in **Heist** from Softspot you have to sort out the chaos at the end of the day.

Your incompetent staff has left money scattered about the bank in bags, and to add to your problems four burglars are out to stop you recovering them and returning them to the vault.

Although outnumbered you have certain aids. There are hammers in the top left and bottom right corners of the screen.

Once you have one you can knock a burglar out and he will stay down for a random time.

However you cannot carry a hammer up or down ladders and if you knock a robber down on a bag of money you cannot pick it

→

From Page 87

up. But you do receive points for each bag of money deposited in the vault.

Cups of tea appear randomly on screen. Drinking them not only refreshes you but entitles you to extra points.

Occasionally a burglar plants a time bomb which you have about 10 seconds to reach and defuse before it blows up.

If you have survived long enough to have collected all the money bags and deposited them in the vault the bank opens for a new day with the robbers even more determined to thwart you.

If however you are not so fortunate the Death March plays and you change into a rather comical angel which floats off up the screen.

Heist is for one player and includes a high score table. There are the usual options to freeze the game or switch off the sound.

A tune plays in the background all the time, and the sound off facility comes in very handy as the tune, although pleasant, gets a little tedious after a while.

SOFTSPOT
HEIST

The game is consistently appealing, making excellent use of graphics and sound.

It loaded first time, is attractively packaged and the instructions are clear and concise.

David Mac

Aye to Eye

EYE is effectively a duet of programs which demonstrate how the mammalian eye works.

It will also show the effects of altering the distance of an object from the eye, changing the size of the iris or the thickness of a lens, the condition of the eye and – if required – the type of spectacle used.

The package, from Longman Micro Software, is suitable for all biology students over the age of 11. However, users are expected to be familiar with the structure of the eye, the term focus and concave and convex lenses.

Eye begins with a labelled diagram of the eye and offers a choice of monochrome or colour display.

From here the program progresses through successive pages on lens thickness, iris diameter (in the first program only), object distance and spectacle type (second program only).

When the user is satisfied, a beam of light is plotted to see if the image is in focus for the chosen set of conditions. The commands available are displayed throughout and a list of explanations of the commands can be used.

The obvious use for such software is as a class demonstration or where individuals or small groups of pupils have access to it.

The teacher's notes provided are short, but pithy and useful.

They cover loading and the use of the software on various hardware, objectives, required knowledge, the model used by the programs, using the programs – including some excellent illustrations of screen displays – and lastly sample exercises.

Overall I can give a resounding, Aye to Eye. It is excellent teaching material for both CSE and 'O' level students and at £14.50, is good value.

Peter Hillman

QUICK RUNS

A first look at some of the latest releases

The Mine: *Tunnelling through the earth's strata in search of buried treasure you must destroy the fire-breathing dragons and man-eating tomatoes to succeed. Release the boulders to crush your enemies and beware the poisonous toadstools.* Program Power)

★ ★ ★

Stock Car: *In this one or two player game you must pit your skill against your opponents' cars. With six different circuits available and a varying skid factor, you control the speed and gears of your car around the twisting tracks.* (Program Power)

★ ★ ★

Bumble Bee: *Guide Bumble Bee round the maze, swinging gates as you go searching for pollen. You may devour the occasional bunch of fruit for bonus points, but beware the toadstools and bowls of food as they are deadly. Watch out for the voracious spiders as they are your most hated enemy. You can tempt them to eat the poison if you are clever enough.* (Program Power)

★ ★ ★

Savage Pond: *In this simulation of an underwater world you play the part of a tadpole. Your sole aim in life is to survive and create a colony of frogs. Your only sources of protection from the various enemies are quick wits and fast reflexes. As you master each stage, a new enemy arrives on the scene to make life even more hazardous. They are all here – bees, spiders, jellyfish, dragonfly and many others – and they are out to get you!* (Starcade)

★ ★ ★

Enigma: *Can you break the code? Most games are played according to set instructions but in these five, you are on your own. Your aim is to discover the rule for each game as the computer accepts or rejects your input.* (Brainbox Software)

★ ★ ★

Darts: *A simulation of the real thing with a choice of 501, round the board and cricket. You control the cross-sight on screen and release the dart when ready.* (MRM)

★ ★ ★

Castle Assault: *In your quest for gold as you scale the heavily defended fortress, you will be assailed by a variety of meanies in the form of crabs, snakes, lobsters, spiders, bugs and beetles. As you negotiate the moving platforms and ladders you must dodge the flying ducks to collect bonus fruits.* (MRM)

★ ★ ★

Screwball: *You have just 60 seconds to change the colour of all the squares by*

Musical lines

LINES and Angles are two programs from 4Mat Educational Software which have their own simple charm and effectiveness.

Any teacher introducing the concepts of vertical and horizontal lines and right angles could do far worse than use either of them.

They both use colour, graphics and sound to good effect and I am sure that any infant or junior child will be captivated and motivated by them.

Perhaps the sound effects to adult ears would soon become a nuisance but young children will love them – ship's hooter, a UFO, the whiring of helicopter blades, and the gobler, who makes his mouth, arm and legs open or position themselves at right angles (or more or less at right angles).

At a bargain price of £5 for the two, no primary school should be without them. Excellent value.

Richard Jones

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jumping on them. The only problem is that you are relentlessly chased by the black bugs who sometimes cheat and don't always walk on the squares. You can trap them by digging holes and as a last resort can hyperspace to the top of the grid . . . but you won't always survive the trip. (MRM)

★ ★ ★

1984: *By taking on the roll of Prime Minister in this management game of survival, you control the British economy in 1982/83. You will be asked to use your judgement to survive three terms of office into the 21st century. You must come through two general elections, and conquer inflation and unemployment single handed or be forced to resign.* (Incentive Software)

★ ★ ★

Plunder: *In this historical sea-based strategy game, you play the part of the captain of a British galleon. You have been commissioned to stop the Spaniards running gold from the New Lands to Spain. Using a hi-res screen of the Atlantic you move your ship and, on coming face to face with the enemy, must decide whether to fight or run, having regard to your crew's morale and the weapons on board. (CCS)*

★ ★ ★

Multibase: *This program contains several utilities which enable you to create, display, search, alter, save, load, add to or delete files. It also has additional facilities which will dump the file to a printer with or without headings.* (G. Soft)

★ ★ ★

Key Definer and Character Generator: **LOADed before or during a program, the key definer sets up the red keys with pre-defined functions. For instance, f0 sends the screen text to the printer, f5 and f6 print the current value of PAGE and TOP respectively, in decimal and hex. The character definer allows you to create your own custom characters by cursor key control and display them in actual size. The characters can be saved and loaded and the VDU23 parameters are also displayed on screen.* (G. Soft)

★ ★ ★

Budget: *Helps you to keep a record of income received and outgoings spent. Designed for the user to enter amounts of money into a database which then calculates annual income from weekly, fortnightly or montly pay, it then allows fixed expenses to be added before producing a balance sheet. Variable expenditure can be entered before the final display section requests a name and year before printing out to the screen or printer.* (Micro-Aid)

At last .. educational software that does the BBC Micro justice

Lift Off With Numbers is a collection of five programs – one of a series of software packages from Shiva on numeracy and logic designed for children aged five to eight years. To say it is excellent doesn't really do it justice – you won't really appreciate how good it is until you use it.

It does make you realise just what standards we should be able to expect from BBC Micro software.

The five taped programs are Washing, Cakes, Rockets, Bingo and Ladybirds. All make good use of colour and graphics, and each has useful documentation.

In Washing a shirt is displayed on the screen and the player has to hang it on the line in the correct position. The washing line appears in the form of a five by four matrix, with the four colours red, green, yellow and mauve along the top and five patterns down the left side.

The patterns are an X, a circle, three horizontal lines, two vertical lines and two thick horizontal lines.

The speed of play is selected and a black arrow appears in each element of the matrix in turn, starting in the top left corner in the area for the yellow shirt with an X on.

The arrow moves along and when you think it is the right place for the displayed shirt you press the space bar to stop it moving.

If the arrow is stopped in the right place the computer responds with "Well done!" and the shirt is "hung" in the right place on the line. A mistake generates the response "No – try again".

Once all the shirts are out on the line then the message appears: "Well done! You hung out the washing in ... tries".

The second program, Cakes, deals with ideas about numbers.

It is a game for two players who each enter their name at the beginning of the program. They also agree between themselves on the speed at which they will play and enter this.

The screen display is divided into two and each player's name appears with a row of six cakes and twenty candles underneath. A die appears on the right of the screen for the first player and the display indicates whose go it is.

As a black arrow moves across the screen at the selected speed, the player has to press the space bar to stop the arrow under the cake with the same number of dots as is shown on the die.

If the arrow is stopped in the right position then the dots on the cake are replaced by candles from the line and the candles are lit up. If the arrow is placed incorrectly however, then the computer bleeps and responds with "Wrong cake!"

The players take it in turns to match the number on the die with their cakes. If the number is for a cake which already has candles lit, then that player misses his go. The first one to have all his cakes correctly lit up is the winner.

The third program, Rockets, is again about one to one correspondence and ordinal aspects of number. It is a simple and attractive program in which eight different sized rocket outlines appear in order of size on the screen.

At the selected speed, an arrow moves along the rockets, and the player has to match a rocket at the bottom of the screen with one of those in the line, by stopping it in the correct place.

If it is stopped in the right place then the outline is coloured in, otherwise the response is "No – try again!" Once all the rockets are in place, the number of tries is displayed and a countdown begins from this number down to zero. When zero is reached, a large rocket blasts off from the bottom of the screen accompanied by suitable sound effects.

The fourth program in this collection is Bingo, which covers the concepts of recognition and understanding of numbers from one to six.

The game is for two players who again enter their names and the speed of the game, and each is then assigned a colour, either red or blue. A display of squares containing groups of dot patterns similar to a die is shown on the screen in five lines of five squares.

Each of the players takes turns to match a number appearing on the right of the screen with one of the squares in the grid having the same number of dots. The squares in the grid light up in turn and the player presses the space bar to select a square when it lights up.

If a correct selection is made, the chosen square is coloured in with that player's colour, and the first player to make a line of squares in their colour is the winner.

If, after 14 squares have been coloured in, neither player has made a line then the game changes to 'board control' in which each player takes it in turn to colour in squares to try to complete a line of their colour. If neither manages to make a line when all the squares are complete, the one with the most squares is the winner.

The last program in the collection is Ladybirds. This is a beautiful two player game about numbers in which ten spotted mummy ladybirds appear on the screen, five for each player.

A baby ladybird appears for each player in turn and that player has to match up the baby with one of the mummies so that the spots on their backs add up to ten.

If the player chooses the wrong ladybird though, the message "That's not my mummy!" flashes onto the screen and the computer bleeps.

It is probably obvious from the description of these programs just how much thought and design has gone into them. They are easy to use as well as being graphically immediately attractive – surely a priority for educational software designed for this age group.

As well as this, the ideas behind each game are original and appealing, unlike so many other educational programs which just turn a boring idea into a boring computer adaptation. This tape provides educational and structured programs presented in a fun-to-learn way which must certainly represent remarkable value for money.

For everyone out there who's got a BBC Micro and has been waiting patiently for the day when software to do it justice appeared, wait no longer.

Jane Jackson

C/WP

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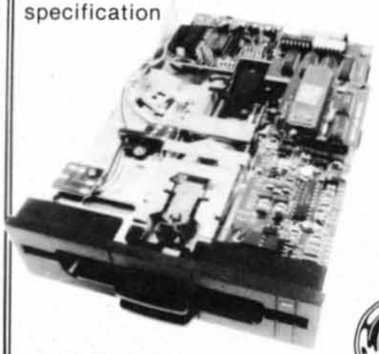

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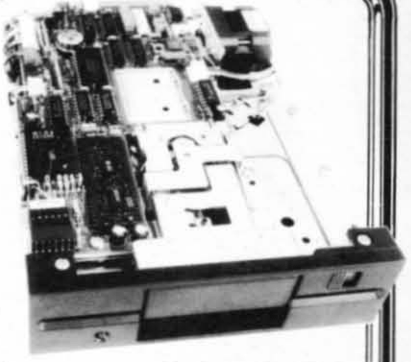

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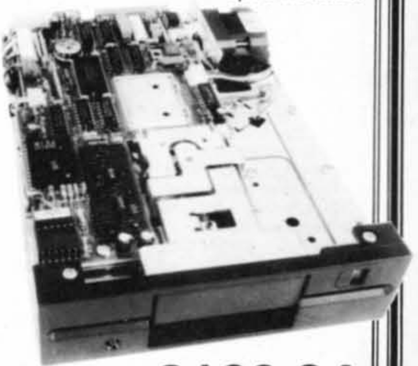

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SCALE is a powerful and totally flexible statement that allows the user to take control of the scaling of the screen. Integers, real numbers and variables can be used.
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CIRCLE and ELLIPSE allow a multitude of shapes to be drawn using a single statement, including:- any regular polygon, circles, arcs, solid sectors, triangles, squares, etc.
FILL is used to 'fill' a previously drawn area, with CFILL setting and colour/pattern/shade within pre-drawn bounds.
TRANS is used to translate the scaled area across the screen by the use of cartesian co-ordinates, subsequent graphics commands making use of the now displaced scaled area.

Plus: SMOVE, SDRAW, SPLOT and UNSCALE.

4 IN 1

GENERAL

LLIST can be programmed, unlike LIST, and under the user's control, multiple statement lines can be split up into their component parts allowing for greater ease of reading.
LGOTO is similar to the GOTO statement but more powerful in that it enables the user to jump to 'labelled lines' allowing for neater and more readable programmes.
SORT allows the user to sort all or part of a string array into alphabetical order using single statement. Invaluable for data processing.
SETWIN and WIN allows the user to define, using SETWIN, and display, using WIN up to seven complete windows on the screen. The user being able to select and return to previously de-selected windows at will, the cursor maintaining its last used position within that window.

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LOGO

LMOVE is used to position the LOGO cursor, usually used prior to further LOGO statements.
ANGLE is used to set the intended direction of the LOGO cursor, the angle being described in degrees.
ADVANCE is used to move the cursor in the direction as set by ANGLE by the distance described in the ADVANCE statement.
TURN gives the cursor a new direction by turning it a certain number of degrees anti-clockwise from its previous direction.
PEN defines the kind of trail left by the LOGO turtle using the internal plot codes.
LCIRCLE and LELLIPSE are the LOGO equivalents of the similar enhanced graphics commands, the shape centre being the current LOGO cursor position.
LPOS is used to return the position of the LOGO cursor from a SCALEd screen.

£28
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TOOLKIT

CHAR is a simplified 'character' designing facility using an enlarged grid that enables the user to quickly and easily construct or alter graphic and pseudo-alphanumeric characters.
COMPACT is used to reduce the size of all or part of an existing program by intelligently appending lines together.
FIND is used to search all or part of a program to find any desired character or set of characters.
GREPL and SREPL are two related commands that enable the user to replace a character or group of characters with any other character or group of characters, under total control of user.
LVAR is used to list all, or alphabetically selected, variable names currently within memory.
VERIFY is a simple command to confirm that a copy to tape or disc is exactly the same as the original program in memory.

Plus: MEM, GOODPROG, KILLREM and FKEYS.

These commands are unlike those on any other ROM, since they are used in exactly the same way as the standard BASIC commands:- i.e. any numeric/string expression, multi-line statements, access to any variable, and of course, no stars!

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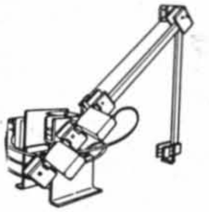
ROBOTICS

ROBOT ARM



The Beasty arm mechanism is driven by the Beasty and three servos, the result being a three axis robot arm. The arm uses a hook to manipulate objects although a gripper can be made by using a further servo. This versatile arm has been designed with enthusiasts and schools in mind although where it will end is anyone's guess!

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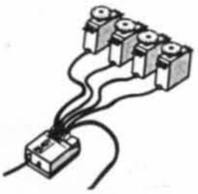
THE BEASTY



The popular Beasty interface connects directly to the BBC Microcomputer which enables the computer to accurately control up to four servo motors. The Beasty comes complete with all connection cables, a demonstration program and comprehensive instructions.

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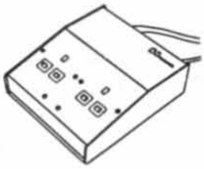

The SJR2 Mains Controller gives you safe, low-cost control of two 13amp mains outlets. Each outlet can be independently switched from Basic. There are lots of applications from security to home appliances, so put your Micro in control . . .

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CONTROL ROM

The Control ROM provides an extension to the BBC Machine for control applications. It's an essential tool for anyone teaching computer control technics, or who wants to use the computer in practical control applications. The process of sending signals to control devices is very crudely handled by most micros and the Control ROM changes this.

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A World Of Information

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originate
answer
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300 Baud
CCITT (Euro)
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Nightingale is by far the most versatile modem available, at the price, for either home or business use. It offers Prestel/Viewdata baud rates (1200/75 & 75/1200) alongside 300/300 baud full duplex for communication between the BBC and other computers, including bulletin boards.

Nightingale will operate at both European and Bell frequencies for compatibility with CCITT and American systems.

The state-of-the-art modem chip technology employed in Nightingale requires minimal support circuitry resulting in low power consumption, low cost, high quality and extreme reliability.

Nightingale being 'hard wired' is not subject to the noise interference errors common to outdated acoustically coupled devices. In addition Nightingale features a simple self test facility for easy installation.

Nightingale utilises a fully buffered RS 423/232 serial interface and is supplied complete with a lead suitable for connection to the BBC micro, other leads are available on request.

However, in order to use such a versatile modem to its fullest potential, you will require equally sophisticated software. This is where Pace can offer you a total solution — Commstar, unquestionably the most comprehensive communications software available for the BBC.

Supplied on Eprom, Commstar is instantly accessible, simple to use and extremely flexible. Just look at the possibilities:- access Prestel, Micronet, Viewfax, Homelink and Telecom Gold, rummage through bulletin boards and chat to literally thousands of other computer users, but there's more. Commstar can be used to emulate specific terminal types such as VT 100 by means of a configuration disc, thus providing the opportunity to use the BBC as an inexpensive work station for a main frame or mini-computer.

The complete Nightingale/Commstar package for the BBC micro including the modem, cabling and the Commstar Eprom and manual is just £139 plus V.A.T. Nightingale is available separately for the BBC and other computers at £119 plus V.A.T. and Commstar is £29.57 plus V.A.T. Further details are available, please telephone or write for comprehensive fact sheets.

PACE

**PACE SOFTWARE LTD.
92 NEW CROSS STREET,
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This modem incorporates the very latest in communication technology and is therefore not yet B.A.B.T. approved.

WIN

this miniature cassette storag

BBC Micro superb high-spee

– without downloading!

Prizes for this month's competition are three of the remarkable new Ultra Drives from Ikon.

The Ultra Drive – really a second generation Hobbit – gives disc-like performance to your BBC Micro, yet leaves PAGE at &E00, avoiding the irritating necessity for downloading.

The system provides up to 70k of storage on each side of a miniature cassette and supports all the standard disc filing commands, including random access, all tape positioning being fully automatic.

Operating at 12000 baud, the system is fast, reliable and versatile – you can "tweek" the transfer rate and also increase maximum storage. In addition, by increasing PAGE to &1600 you can have up to five files open concurrently.

And, of course, the system comes complete with a comprehensive set of utilities.

So if you're considering upgrading your system from an ordinary cassette, yet find disc systems too expensive, why not try this month's contest? And it couldn't be easier. All you have to do is to help us sort out the editor's latest ramblings *(see entry form)*.

We all thought it was his usual post-lunch mental state, but he claims it's a cunning competition. Apparently

Communications ROM and Modem winner

WINNER of our May competition was Ruth Allum, from Derby. Her prize is the excellent Commstar communications ROM from Pace, together with their modem.

The winning entry was:

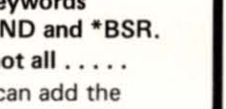
❛As I am deaf I would use a Grapevine to keep in touch with my family by telephone when I leave home. I should like to start a bulletin board for deaf young people in this area, perhaps through the Royal School for the Deaf, Derby.

It could be extended to the National Deaf Children's Society.

This would be very exciting for people like myself who cannot use an ordinary telephone to talk to our friends – this is most frustrating!❜

BASIC
TOOLKIT
ROM
LOCK
UNLOCK
ARCHIVE
RETRIEVE

The TOOLKIT with CRUNCH



BTOOL is the toolkit to assist in writing your BASIC programs, because it contains its own line cruncher - thus enabling BASIC keywords and part keywords to be used in *BFIND and *BSR.

But that's not all . . . . .

Now you can add the following commands to your series 1 Operating System.

*BSR	Global search and replace for any string including keywords.
*BLIST	Produces a "prettyprint" listing, by splitting up multistatement lines.
*BEQUIV	Allows passing of array names to PROCedures and FuNctions.
*BFIND	Finds all occurrences of a string within the given range. >*BFIND C_ 100PROC_FLUSH 200PROC_DELAY(2)
*BOVERLAY	Allows simple overlaying of program sections.
*BREPORT	Indicates the exact position within a line at which a BASIC program fails.

Plus..........

*BMERGE *BMEND *BVERIFY *BCRC
*BSHIFT *BMOVE *BPACK *BMEM
*BLIM
*LOCK *UNLOCK *ARCHIVE *RETRIEVE

. . . . together with *HELP and password protection (requires a password to be entered on power up).

Note: password (if required) may include up to ten alpha numeric characters.

THE BTOOL ROM COMPLETE WITH MANUAL . . . £22

Access

BTOOL reaches the parts of BASIC that others cannot reach!

Further details available from DATAWARE

Access

SPELLWISE

The spelin cheka forr the BBC mikro and Werdwyse.

SPELLWISE is a machine code spelling checker with a 6000 word dictionary (3000 on tape) which can be expanded to include your own specialist vocabulary.

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there are all sorts of words, phrases and abbreviations associated with computing hidden away there.

We've managed to find some of them, so we think he's telling the truth. Anyway, why don't you have a go and see how many you can find?

What you're looking for may be parts of longer words, or several more words joined together (you can ignore any intervening punctuation). Pairs of words cannot be split into singles. For example, INPUT LINE cannot count both as INPUT and INPUT LINE. Only the first occurrence of any word will count.

Underline everything you find on the coupon, and don't forget to let us know how many you've managed.

Closing date for entries is August 30, 1984.

Your FREE entry form

Underline each word, phrase or abbreviation associated with computing on the letter opposite. Count how many you found and fill in the number in the box below.

Name ____________________

Address ____________________

____

____

____

I found ☐ computing terms.

Send your entry to: Ultra Drive Contest, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Dear Fred

The din was unbearable this morning. I peeked through the window at a nearby tent in the field next to my house. A foreign character poked his nose out of the opening and emerged. I would have said something there and then but he was out of range.

Now I'm all for racial harmony, but to provide our pal with his own radio program so that he could do an early morning rumba sickens me. I must put a stop to it. In fact I was about to signal to him when . . .

"Lend us a pound to go down t'local, I'm skint", errupted husband Jim behind me. He was rather flushed after removing page 3 from the morning paper.

I turned on him and chipped in: "I was due some back tax this month but the event didn't occur, so run down to the bank will you and ask for a loan. You can't escape your responsibilities where money is concerned".

I really must find him employment soon. In key jobs you can earn quite a lot of cash these days, and Len, his stepbrother, who's a driving instructor, is a first class example.

You know, hubby's not all bad. Dim perhaps, but not too big to be tackled single-handed. I recently sent him out with a list of things I wanted him to get for me. I suppose I should have seen him across the road.

I soon realised my mistake when a double-decker bus nearly knocked him head over heels. He ended up draped over the garden wall!

I'm alone now save for Sheila, Jim's wife, who's a load of fun really. This morning she's sporting a rather nice modern sapphire number that she bought last week after winning a modest first dividend on the pools.

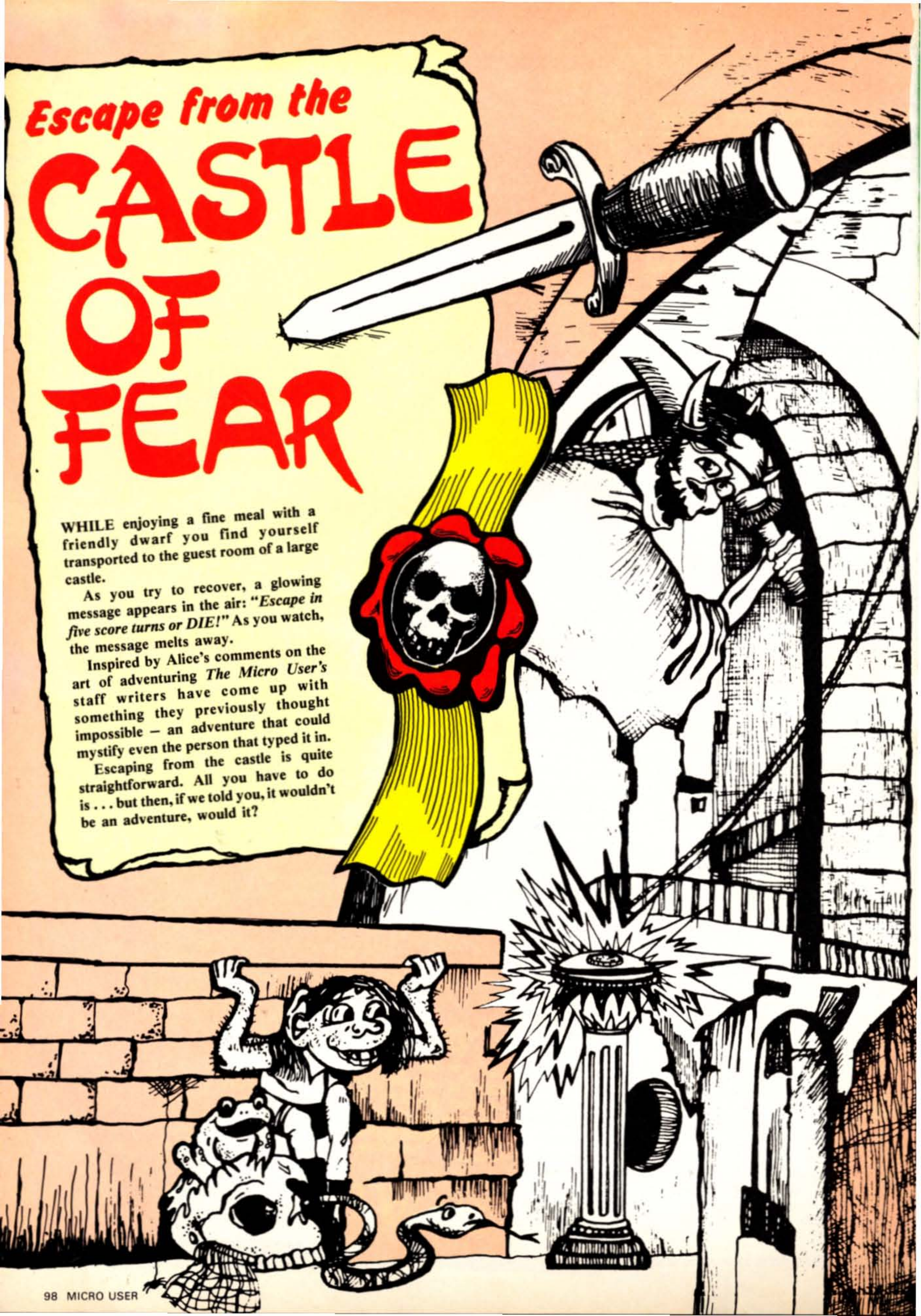
And of course there's daughter Anne. At the moment she's hanging from the rafters doing her Tarzan act. She'll have to be careful with that rope. Rip her almost in two, it will, if she's not careful.

Jim's just returned from the bank. I wonder if he bothered to open up an account there at last. There's no point really but it would avoid a repeat of our regular arguments about money.

Gosh, look at the time. I'll break off now. Got to go to work. Bye until Friday.

Yours with true affection,

Val



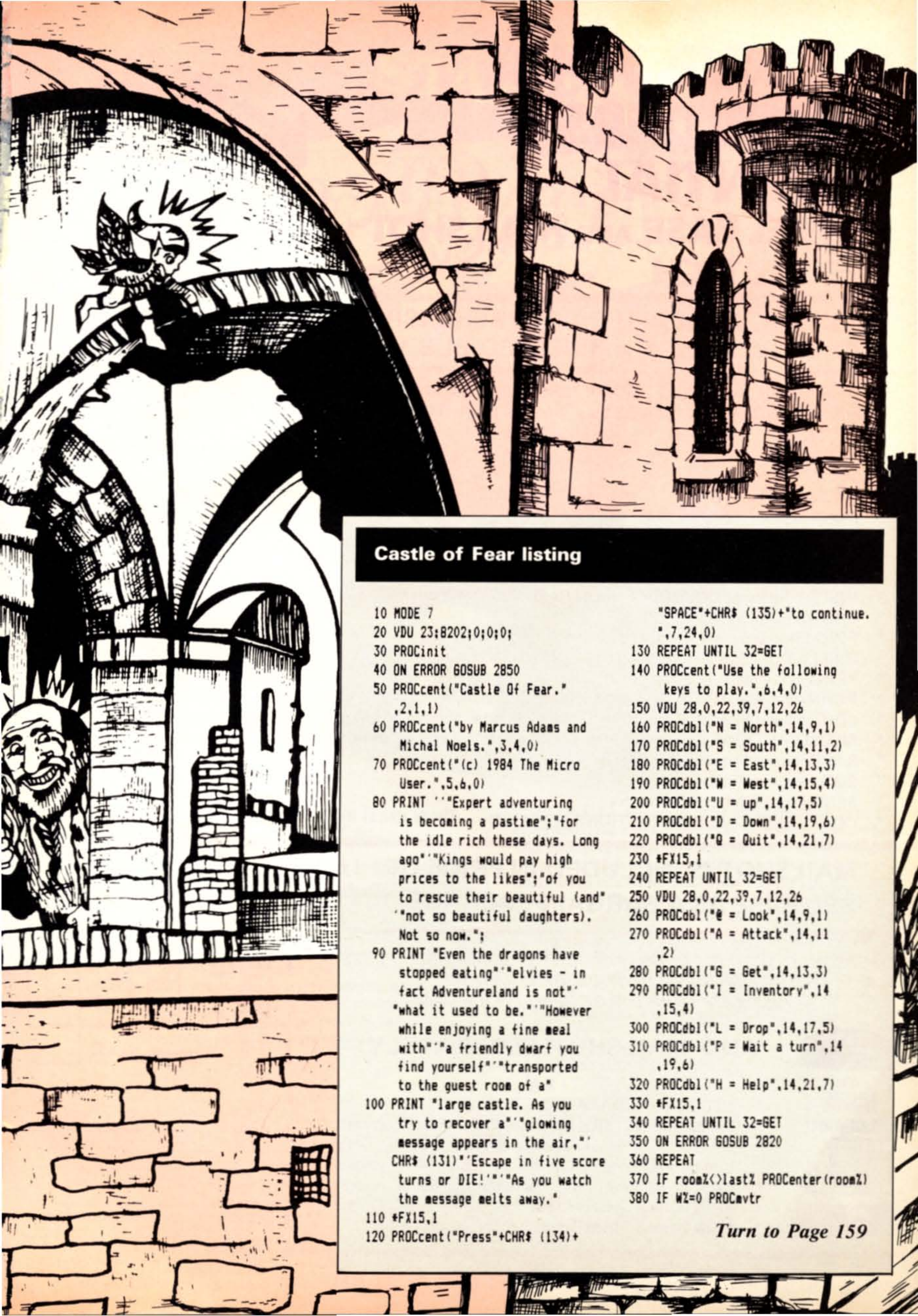
Escape from the CASTLE OF FEAR

WHILE enjoying a fine meal with a friendly dwarf you find yourself transported to the guest room of a large castle.

As you try to recover, a glowing message appears in the air: *"Escape in five score turns or DIE!"* As you watch, the message melts away.

Inspired by Alice's comments on the art of adventuring *The Micro User's* staff writers have come up with something they previously thought impossible – an adventure that could mystify even the person that typed it in.

Escaping from the castle is quite straightforward. All you have to do is . . . but then, if we told you, it wouldn't be an adventure, would it?



Castle of Fear listing

```
10 MODE 7
20 VDU 23;8202;0;0;0;
30 PROCinit
40 ON ERROR GOSUB 2850
50 PROCcent("Castle Of Fear."
   ,2,1,1)
60 PROCcent("by Marcus Adams and
    Michal Noels.",3,4,0)
70 PROCcent("(c) 1984 The Micro
    User.",5,6,0)
80 PRINT ''"Expert adventuring
    is becoming a pastime";"for
    the idle rich these days. Long
    ago"'"Kings would pay high
    prices to the likes";"of you
    to rescue their beautiful (and"
   '"not so beautiful daughters).
    Not so now.";
90 PRINT "Even the dragons have
    stopped eating"'"elvies - in
    fact Adventureland is not"'
   "what it used to be."'"However
    while enjoying a fine meal
    with"'"a friendly dwarf you
    find yourself"'"transported
    to the guest room of a"
100 PRINT "large castle. As you
    try to recover a"'"glowing
    message appears in the air,"'
   CHR$ (131)"'Escape in five score
    turns or DIE!'"'"As you watch
    the message melts away."
110 *FX15,1
120 PROCcent("Press"+CHR$ (134)+
    "SPACE"+CHR$ (135)+"to continue.
    ",7,24,0)
130 REPEAT UNTIL 32=GET
140 PROCcent("Use the following
     keys to play.",6,4,0)
150 VDU 28,0,22,39,7,12,26
160 PROCdbl("N = North",14,9,1)
170 PROCdbl("S = South",14,11,2)
180 PROCdbl("E = East",14,13,3)
190 PROCdbl("W = West",14,15,4)
200 PROCdbl("U = up",14,17,5)
210 PROCdbl("D = Down",14,19,6)
220 PROCdbl("Q = Quit",14,21,7)
230 *FX15,1
240 REPEAT UNTIL 32=GET
250 VDU 28,0,22,3?,7,12,26
260 PROCdbl("@ = Look",14,9,1)
270 PROCdbl("A = Attack",14,11
    ,2)
280 PROCdbl("G = Get",14,13,3)
290 PROCdbl("I = Inventory",14
    ,15,4)
300 PROCdbl("L = Drop",14,17,5)
310 PROCdbl("P = Wait a turn",14
    ,19,6)
320 PROCdbl("H = Help",14,21,7)
330 *FX15,1
340 REPEAT UNTIL 32=GET
350 ON ERROR GOSUB 2820
360 REPEAT
370 IF room%<>last% PROCenter(room%)
380 IF W%=0 PROCmvtr
```

Turn to Page 159

OPENUP YOUR COMPUTERS POTENTIAL

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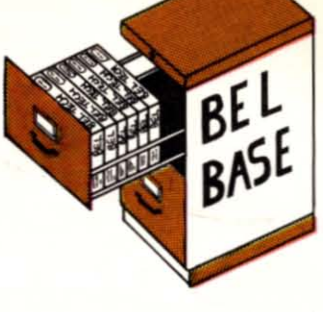
FROM **BEL TECH**



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MAIL SHOT	9.50		11.50		

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MIKE COOK'S PROBLEM PAGE

We've got breakfast time blues

DURING December I bought a BBC Model B and a cassette recorder from Boots.

We initially experienced many problems loading the few tapes we possessed at that time.

A friend very kindly came to our assistance and pointed out the importance of tone and volume settings. This resulted in a satisfactory situation whereby we could fully utilise the computer's capabilities.

Recently, however, it seems to have become increasingly difficult to load tapes and indeed most days, at breakfast time and between 4.30pm and 7.30pm – sometimes for whole evenings – we are unable to load tapes at all.

The tape does not generate any response from the computer – no funny symbols which we experienced back in December.

I'm told that minor voltage reductions in the vicinity can cause communication problems, but must stress that at the moment I find the situation eminently unsatisfactory.

Can you advise what I should do to overcome these problems? My feeling at the moment is that the cassette recorder – a Boots CR375 – is the cause. Do you agree?

Incidentally volume and tone settings are left untouched and in the same position. – *G.N. Chedzey, Cowplain, Portsmouth.*

● **I think I am correct in believing that it will work in the shop but not in your home. You give times when it will not work but do not say whether it will work outside that time.**

I am almost certain that minor voltage reductions are not the cause. However, you could also try inserting batteries to see if that helps.

You could also be suffering from some kind of interference, although I must confess that I would not have expected no response if you were. Interference could be generated by a nearby radio transmitter such as a taxi or CB enthusiast.

I can only suggest that you get a service man or a friend to visit your house with an oscilloscope and test the system in situ. A local computer club might be able to put you in touch with someone who could do this for you.

To be quite candid, if it works in the shop and not at your house I am inclined to think you are doing something wrong in your operation.

Try moving the cables around and routing them away from the TV set, or else call someone in.

On the slide

I AM writing to enquire whether the Body Building Pack 5 could be used to control a Prestinox slide projector.

The projector is mains operated using a hand slide change unit connected to the body of the machine by a six pin Din connector.

I want to try to connect it to an education program so that the operator can then call on a slide already loaded in the projector through the software. – *Martin A. Nelson, Leeds.*

● **Pack 5 can be used to turn a mains device on and off. This would not seem to be what you want to do. You want to replace the hand slide changer with a simple relay.**

This could be done with Pack 3 (this requires also Packs 1 and 2) or you could connect this socket to the cassette relay inside the micro and use the *MOTOR commands to pulse the relay.

Use a battery and bulb or a resistance meter to find out which two of the six pins short out when the slide change button is pressed and wire them to the motor pins on the cassette input socket.

Voice control

I HAVE a Cheetah speech chip fitted and am absolutely delighted with it.

After seeing a letter in your May issue where N. Spooner of East Sussex was trying to turn down the volume and altered the clock frequency control of the speech synthesiser by accident, I was interested to see if I could alter the pitch of the voice.

Alas, all I could find was the blue volume control I turned up about a year ago.

Where is the frequency control? Perhaps it was never fitted – I have one of the very first Model As, now upgraded.

Also, I would like to know where I can put a resistor to reduce the irritating "buzz" from the speaker? – *S.J. Bates, Worcester.*

● **The speech chip frequency control was only fitted to boards from issue four onwards. On earlier boards, the dealer has to fit a fixed resistor and capacitor to the board and alter them if the speed is wrong.**

This only applies to the Acorn speech system which is based around the Texas Instruments TMS 5220 voice synthesis chip. There are other speech systems around that use the alaphone method of producing speech and as such do not use the built in speech controls.

I am not sure if your chip is of this type. If it is you would not be able to alter the frequency of the voice even if you had the control on your board.

PAGE is the answer

I RECENTLY bought your Microgolf cassette, and am finding problems.

They are these:

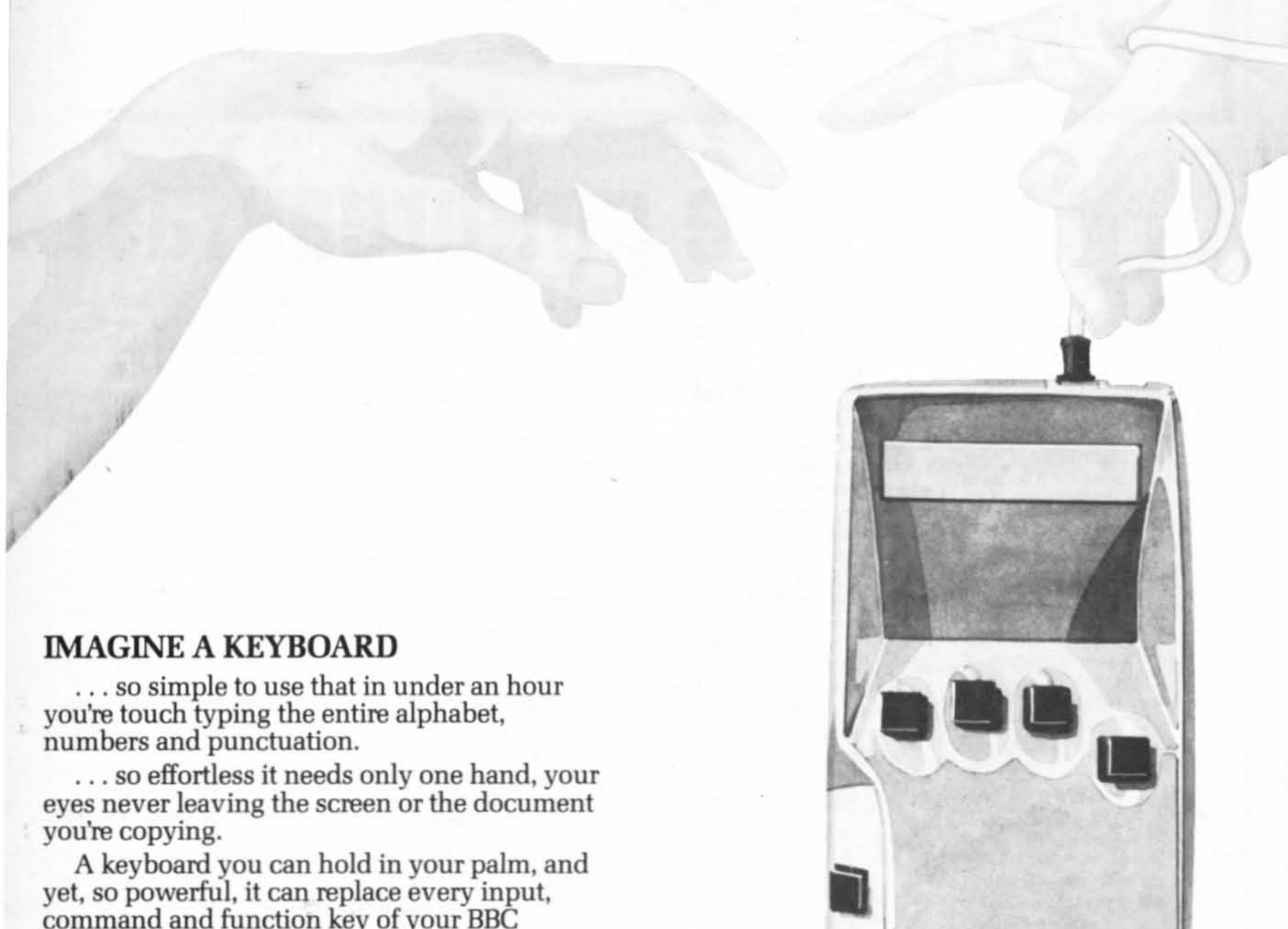
- Microgolf – bad mode at line 50.
- Eastermaze – bad mode at line 10.
- Owl – bad mode at line 10.
- TRX1 – no such variable at line 450.
- TRX2 – no such variable at line 160.

The cassette recorder heads are clean and demagnetised, and I have tried the volume control

→

You've got a problem with your micro and you just can't sort it out on your own? Then write to MIKE COOK. If he can't help then probably no one can . .

CLEARLY HE HAD ONLY ONE KEYBOARD IN MIND WHEN HE DESIGNED THE HUMAN HAND



IMAGINE A KEYBOARD

. . . so simple to use that in under an hour you're touch typing the entire alphabet, numbers and punctuation.

. . . so effortless it needs only one hand, your eyes never leaving the screen or the document you're copying.

A keyboard you can hold in your palm, and yet, so powerful, it can replace every input, command and function key of your BBC computer . . .

Just think how effortless it would be if you could *touch type* your programs, data and text.

How you could lean back and relax; be faster and more accurate; your mind free to think, and your eyes to read.

IT'S CALLED QUINKEY

And for **£49.95** you'll get everything you need — hardware and software — to use Quinkey with your BBC computer.

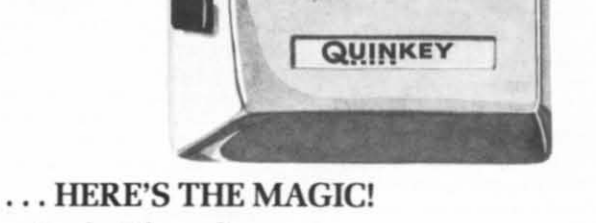
HOW CAN 6 KEYS DO THE WORK OF 72?

You simply press the keys in different combinations. Each combination represents a character.

Quinkey has 5 keys plus a Control key, each finger belonging to its own key — so there's no need to hunt and peck . . . BUT . . .

. . . HERE'S THE MAGIC!

Look at these diagrams:



See how the lines joining the key combinations form the characters? For each letter there's an instantly recognised and easily memorised visual clue.

That's the trick — and it works!

YOU CAN TRY IT NOW!

Rest the fingers of your right hand on a table top. Imagine the keys.

To write an "I" you press your Thumb and Index finger down at the same time.

For an "L" you press your Thumb, Index and Little fingers.

To write "Y" you use your Thumb, Middle and Ring fingers . . . and so on.

That's all there is to it.

Here's what users are saying about the keyboard:

– PETER RODWELL (as Editor of 'Personal Computer World') "took me half an hour to learn the alphabet . . . far easier than learning to type. It's an addictive device, and I'm starting to wonder how I ever managed without one."

– PETER WHEELER (in the 'Times Educational Supplement') "a new user can start to touch type after one hour's usage."

– FRANK DALE (BBC Producer – writing in 'Electronic Times') "no other machine is so easy to use, so easy to learn, so generally useful . . ."

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- ★ Breakthrough multi-channel interface for up to four keyboards (plug into analogue port).
- ★ Two new powerful software packages, PROG & WP (described below).
- ★ Comprehensive Quinkey manual.

"PROG" and "WP" (free with the Quinkey package) are utility programs written specially for the BBC.

"PROG" enables your BBC to recognise and interpret the signals from the Quinkey keyboard. It combines easily with your application programs enabling you to use Quinkey as a comprehensive alternative keyboard.

"WP" optimises Quinkey to work with word-processing packages "Wordwise," "View" and "Edword" – a perfect text-writing combination.

KEYBOARD RANGE.

All BBC "B" keyboard inputs generate from the Quinkey, except the hard-wire key, "Break."

TECHNICAL DATA:
Loading length: &605. Running length: &300.
No zero-page locations, all ADC channels.
Interrupt service vector IRQ2V, correctly chained.

TESTED COMPATIBILITY

BBC Model "B"	Acorn
OS 1.2	
BASIC I or BASIC II (unless using INKEY with negative argument)	Acorn
DFS 0.90	Acorn
View A1.4	Acornsoft
Wordwise 1.17	Computer Concepts
Edword	Clwyd Technics

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QUINKEY
THE BEST IDEA SINCE THE HUMAN HAND

IF you have a technical query for this page, send it to Mike Cook, *The Micro User*, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Letters on other subjects should be sent, as usual, to Micromail, which this month starts on Page 177.

From Page 101

from 0 through to 10 without effect.

My equipment is a BBC B plus Torch Z80 disc pack. – *P.M. Fullman, Canterbury.*

● **I think that your problem is one of PAGE. The sideways ROM chip that looks after the Z80 second processor takes some work space on power up. All the games use a lot of memory.**

Before loading the tape in, type in PAGE=&E00, or if you want to still use the discs, use PAGE=&1900, load in the program and save it to disc.

Then use a downloading program – see Micromail, July, 1984.

Will it or Won't it?

I RECENTLY bought one of your light pen kits. Having assembled it and obtained a reaction when I ran the test program I found that the third number appearing on the screen was 1023.

When this is multiplied by 64 it gives a value of 65472 for ADVAL(1) which would indicate that the pen is giving maximum value off the screen.

This is also the value if the pen is pointed at the window.

The cursor does not follow the pen very well and can wander round the screen in some modes. When tested with the bell ringing program it is very hit and miss. – *C.H. Gibson, Stockport, Cheshire.*

● **It sounds as though you have a fault in the construction of the light pen detector circuit. As the detector is receiving only pulses you should only get a small value when it is pointing at the screen. The response is correct when pointing at the window.**

It sounds like there is no earth connection on the capacitor or that the 270K resistor is not connected properly, allowing the capacitor to discharge.

Careful control of the screen brightness should improve its accuracy, but a fault in construction could be causing the problem. Make sure you have not confused the values marked on the resistors.

Piggyback problems

I WAS interested in your reply to a letter published in the May 1984 issue on fitting the Wordwise ROM.

My machine's symptoms are similar but intermittent. It is a BBC B with Acorn DFS and Wordwise, and 1.0 OS in a piggyback setup.

I obtain "Bad command" if *TAPE is previously executed but a complete hangup if the *DISC is activated. A car trip to the dealer seems to clear the fault for a while.

Is the treatment you suggest applicable in my case? – *D.C. Morgan, Budleigh Salterton.*

● **I think you probably don't have the same trouble but have an intermittent connection.**

This is likely to be the piggyback board of your 1.0 OS. These are notorious for not being reliable. Try pushing it home firmly.

If the problem persists, get a 1.2 OS ROM but as the piggyback board will probably have damaged the connections on the socket, you will have to get a dealer to fit a new one.

Light on a problem

OUR problem is simply this – we have a BBC Model A but we can never find out whether the listings or advertised BBC tapes from *The Micro User* will function on our machine.

For instance, we wasted a considerable amount of time recently typing in a listing for Bingo to find later that it would only work on somebody else's Model B.

Other manufacturers of software appear to state this information clearly in their advertisements.

Can you give us more helpful information? – *R. M Dutton, Crewe Secondary Unit, Crewe.*

● **I think it is fair to say that most of the larger games in *The Micro User* require a machine with 32k of memory. There can be no hard and fast rule on how to tell from a listing how much memory it will require.**

However if you see a command for Mode 0, 1, 2, or 3, then this in itself requires 20k and so will only work on a 32k machine. Unfortunately this is used on nearly all games to get full colour.

It is not necessary to add all the extra components of a full Model B upgrade, only the memory. Incidentally, if you have any Acornsoft games, they sometimes also require the presence of the 6522 VIA.

Full details of A to B conversions were given in the Body Building Course in the March and April, 1983, issues of *The Micro User*.

RS423 port – is there a link?

IN attempting to connect a BBC Model B to a Terco CNC milling machine I have a problem in setting the parity and word format on the micro.

The Terco operates on even parity and the link between the machines is via the RS423/RS232 serial ports.

Neither the User Guide nor Advanced User Guide give any information on parity setting and the only reference I have found is in "The BBC Micro – an expert guide" by Mike James. Page 10 of this text indicates the ACIA control register format.

However, writing into the ACIA at &FE08 the values &13 (master reset) followed by &1A or &19 to give an 8 bit word length with even parity does not appear to have any effect.

Setting the baud rates compatible (using *FX7,2 and *FX8,2) and outputting all keyboard entries via the RS423 using *FX3,5 results in even parity characters (for example E & S) being accepted.

If an odd parity character (for example, F or X) is transmitted the Terco detects a parity error and stops accepting data.

It may be that my interpretation of the necessary commands is at fault, but I have also been informed that it could be a bug in the MOS.

Is this a problem of which you are aware? I would be most grateful if you could print, or give a reference to setting parity and word format when interfacing via the RS423.

The intention is to use the RS423 as a serial printer port (*FX5,2) and then use VDU2/VDU3 within a Basic program to "Print" appropriate information to the Terco.

In view of the lack of published information on this aspect of interfacing, I think that a reply would be of interest to anyone contemplating, or attempting to, link equipment together via the RS423 port. – *George Edwards, Wrexham, Clwyd.*

● **You cannot write directly to the ACIA as whenever the operating system wants to change any bits it will simply write over the bits you have set, as the control register of the ACIA is a write only register.**

This is what is happening when you try to change the format.

The correct way is to use an OSBYTE command or its *FX equivalent. In this way when the operating system wants to set a bit to enable the RS423 system it will know what state to make the other bits.

The list below gives all the word formats the ACIA is capable of.

To change the data format use *FX156,X,227 where X is not a variable but the number corresponding to the format you want.

X	Data Format
0	7 data + even parity + 2 stop bits
4	7 data + odd parity + 2 stop bits
8	7 data + even parity + 1 stop bit
12	7 data + odd parity + 1 stop bit
16	8 data + 2 stop bits
20	8 data + 1 stop bit
24	8 data + even parity + 1 stop bit
28	8 data + odd parity + 1 stop bit

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COMMANDS

***CHECK**	Verify a program or data in memory with disc/cassette.
***CLEAR**	Clear all variables including integers.
***EDIT**	Enter full screen editor.
***FREE**	Display free memory and pseudo variables.
***HELP INFO**	Display a screenful of useful system information.
***MEMORY**	Display memory contents.
***MERGE**	Merge a program in memory with one on disc/cassette.
***MOVE**	Move program to run at specified address.
***NEW**	As NEW, but can be issued from within a program.
***OFF**	Cancel enhanced error handling.
***OLD**	As OLD, but can be issued from within a program.
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***UTIL 2**	String search and replace.
***UTIL 3**	Move Basic program lines.
***UTIL 4**	List procedures and functions.
***UTIL 5**	List values of A% to Z%.
***UTIL 6**	List numeric variables.
***UTIL 7**	List string variables.
***UTIL 8**	List names of arrays.
***UTIL 9**	Set up range for utilities 1 and 2.

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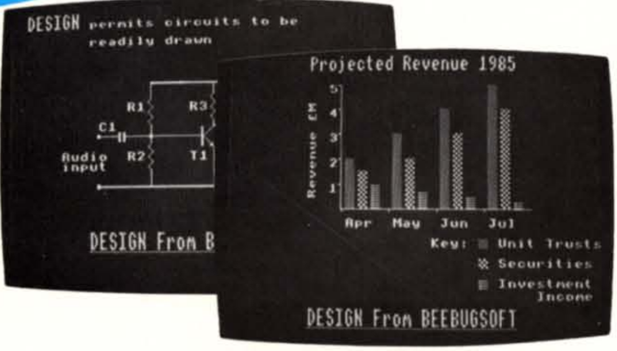
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R3
C1
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R2
T1
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Machine code screen dumps are included for Epson, Seikosha, Shinwa and Star printers and details on how to load dumps for other printers are also included.

Screens may also be saved and reloaded to cassette or disc.

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> "A first rate screen processor . . . immense value to schools and colleges . . . ideal tool for preparing display material . . ."
>
> *Educational Computing* April 1984

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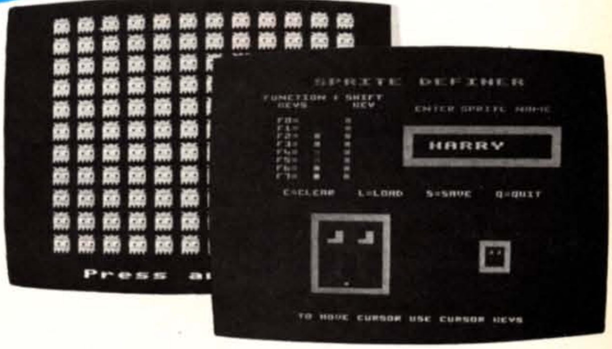
Press a
SPRITE DEFINER
FUNCTION + SHIFT KEYS KEY
ENTER SPRITE NAME
F0=
F1=
F2=
F3=
F4=
F5=
F6=
F7=
HARRY
C=CLEAR
L=LOAD
S=SAVE
Q=QUIT
TO MOVE CURSOR USE CURSOR KEYS

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> *Electronics & Computing* May 1984
>
> ". . . For my money Sprite Utilities wins through . . ." *Acorn User* May 1984

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3D BOMB ALLEY

3D BOMB ALLEY

... the continued thunder of the hissing ground missiles had long now deafened him - unless he had some of those bombers down, the fleet, in the small stretch of water was a sitting duck... 3D ACTION, SOUND EFFECTS, BEAUTIFUL GRAPHICS BBC MODEL B £7.95 CASSETTE £11.95 DISK

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ATTACK ON ALPHA CENTAURI

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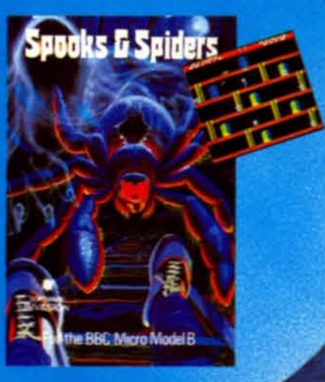

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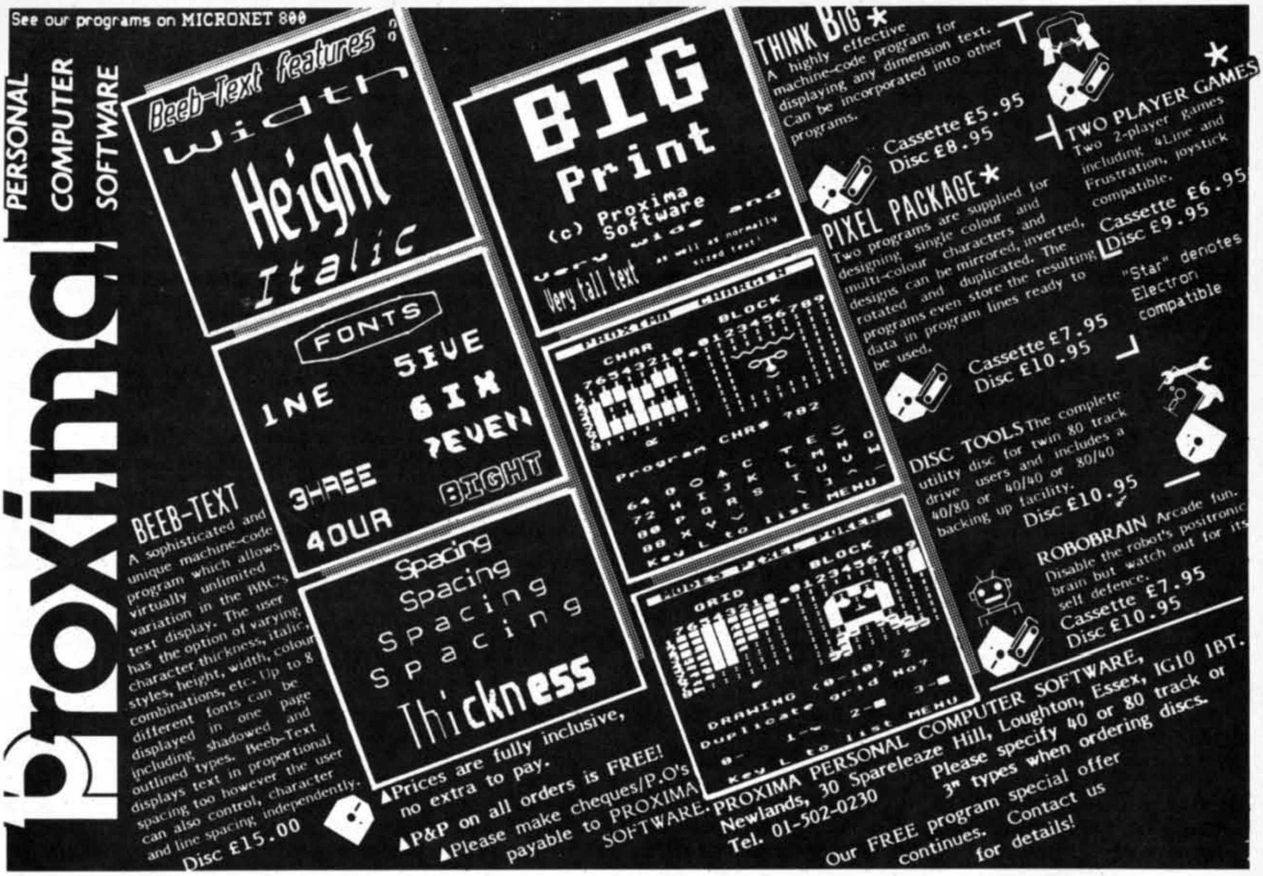
Beeb-Text features
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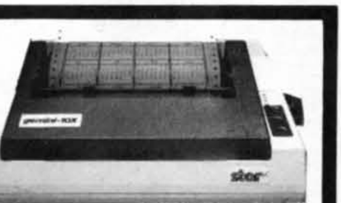

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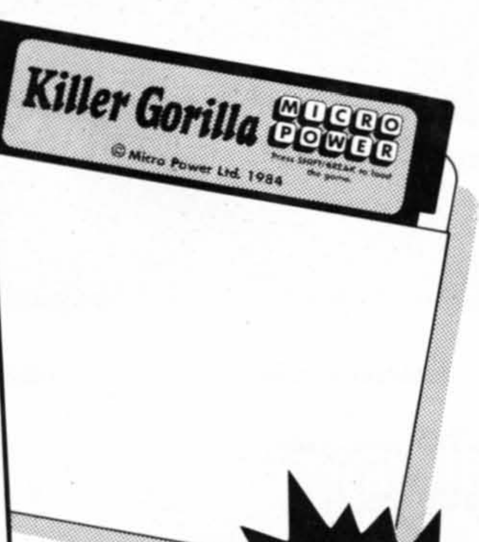

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DEDIT

A powerful tool to recover data that's gone astray on a 40 track disc. But be warned – use with caution!

By KEVIN EDWARDS

DEDIT is a 40 track disc editor that will enable you to edit any sector on any track of a disc. If you're careful you'll be able to recover programs you've deleted, protect discs and go some way towards reconstructing corrupted files – though of course, nothing can restore data that's been physically destroyed.

When Dedit is run, you will be asked to enter the track number you wish to edit. This must be in the range 0-39 for a 40 track disc. You will then be asked for the sector number you wish to edit, which must be in the range 0-9.

When the entries have been accepted, the track number and sector number will be displayed on the screen. If you wish to re-enter the numbers, press the Escape key. Any other key will load the sector specified.

The program expects to find the disc to be edited in drive zero. The sector is loaded into memory at &C00, up to &CFF – the user-defined character buffer.

That block of memory is now displayed on the screen in hex as well as in the corresponding Ascii characters.

You'll notice that the first of the bytes is coloured magenta. This colouring shows the position of the cursor.

Now, scrolling around the block of memory with the cursor keys, you can edit individual bytes.

There are two modes of doing this. If the cursor is magenta, the Ascii character you type is stored as a hex number in the location under the cursor. That is, if you typed A, 41 would appear at the cursor since &41 is the hex Ascii for A.

This mode is useful for directly entering strings into the disc. For instance, you could change the characters following a REM statement in a program file or you could manipulate the disc title so that nasty things happen when you try to *CAT.

Pressing the Copy key toggles us into the second mode, the hex mode, and the cursor colour turns cyan. Here you simply type in the hex number you require. So to enter EA into a location you would type in E followed by A.

You could use this for entering a bit of machine code after REM statements – always useful for protection.

You can move simply between the modes by pressing the Copy key. When you have finished editing the sector, press the Escape key.

You can now choose one of three options – continue editing, save the sector to disc or re-run the program.

To save the sector to disc press the Y key. Remember the sector cannot be saved to disc if the disc has a write protect tab on it.

If you wish to re-run the program press the R key.

The final option is to return back to the editing mode. To do this press the Escape key.

It is possible that the sector cannot be saved to disc. For instance, there may be a fault on the disc. If this happens you can try to save the sector again or re-run the program.

The directory of the disc is held on sectors 0 and 1 of track 0. Changing the contents of these sectors allows the user to recover programs and protect discs.

As an illustration of Dedit's use, here are some discoveries I made while looking at the way the Acorn DFS handles its discs.

This is an example of the display produced when editing track 0 sector 0 using Dedit:

```
C00 41 42 43 44 45 46 47 48 ABCDEFGH
```

C00-C07 are the first eight characters of the disc's title. In the above case, the disc title starts ABCDEFGH . . .

C08-CF8 holds the files titles and their directory character. For example:

```
C08 50 52 4F 47 31 20 20 24 PROG1  $
```

shows the program titled PROG1 is in directory "$".

The first seven characters correspond to the file name and the final character is the directory character. If the file is locked, then the most significant bit of the directory character is set to 1.

C10-CF8 continue in the same manner, allowing a maximum of 31 files.

Below is an example of the display produced when editing track 0 sector 1.

```
C00 49 4A 4B 4C WW XX YY ZZ IJKL????
```

????	Any set of characters depending upon the contents of the disc. The first four characters correspond to the final four characters of the disc title – in case you'd been wondering where they were.
WW	The number of times the disc has been updated.
XX	This byte corresponds to the number of files on the disc times eight.
YY	The four most significant bits of this byte correspond to the option selected by the *OPT4,x. The four least significant bits correspond to bits 8-11 of the number of sectors on the disc.
ZZ	Bits 0-7 of the number of sectors on the disc.
C08-CF8	Holds the file information. This includes the load address, execution address, length of the file and the sector address of the file.

For example, when editing track 0 sector 1 you might find something like this:

```
C08 00 19 23 80 7F 04 MM NN ..£...??
```

??	Any pair of characters depen-

→

From Page 111

ding upon the contents of the disc.

The first two bytes of C08 correspond to the load address of the file, &1900 in the example above. The next two correspond to the execution address, &8023 in this case, and the next two correspond to the length of the file, &47F above. This format is repeated from C10-CF8.

MM holds information about the type of file, such as Basic or machine code, the most significant bits of the block length and the most significant bits of the sector address of the files.

&MM	% XXYYXXZZ
XX	% 11 for a Basic or % 00 for a machine code program.
YY	Bits 8 and 9 of the file length.
ZZ	Bits 8 and 9 of the start sector address of the file.
&NN	Bits 0-7 of the sector address for the file.

As you can see, it's all rather complex.

When first using Dedit, edit a disc which does not contain any important data. Until you're used to it, it's all too easy to destroy your precious information.

Remember, Dedit is a very powerful tool – and there's plenty of scope for some pretty powerful mistakes.

```
  100 REM Disc editor
  110 REM (c) Micro User 1984
  120 REM
  130 ONERRORRUN
  140 *FX12,12
  150 *TV255
  160 MODE7:VDU23;8202;0;0;0;:HIMEM=&
7B00:@%=4
  170 PRINT':FORL%=1TO2:VDU141,157,13
5,129:PRINT"     40 Track disc editor
":NEXT
  180 PRINT'''"Ensure disc is in driv
e 0."''
  190 PRINT''"Which track  do you wis
h to edit ";:PROCInput_int(2):IF A$="
" OR VAL(A$)>39 THEN PRINT''"Invalid
track !":GOTO 190
  200 Track%=VAL(A$)
  210 PRINT''"Which sector do you wis
h to edit ";:PROCInput_int(1):IF A$="
" THEN PRINT''"Invalid sector !":GOTO
 210
  220 Sector%=VAL(A$)
  230 CLS:PRINT'''"Track   = ";:VDU13
3:PRINT;Track%'''"Sector  = ";:VDU134
:PRINT;Sector%
  240 PRINT'':VDU136,130:PRINT"      P
ress key to continue":*FX15
  250 REPEAT UNTIL GET
  260 !&7B00=&C0000:!&7B04=&530300:?&
7B07=Track%:?&7B08=Sector%:?&7B09=&21
  270 A%=&7F:X%=0:Y%=&7B:CALL&FFF1
  280 IF ?&7B0A<>0 THEN PRINT'''"Read
 error !"'''"Press 'Escape' to re-run
 program  OR"''"any other key to re-t
ry." ELSE 300
  290 REPEAT UNTIL GET:GOTO260
  300 ONERRORGOTO410
  310 *FX4,1
  320 CLS:VDU28,0,24,39,0
  330 MX%=0:MY%=12:Base%=&C00:Top%=0:
Bot%=&C0:Type%=0
  340 FORY%=0TO24:PROCp(Y%,Base%+(8*Y
%)):NEXT
  350 PROCc:A$=GET$:A=ASC(A$)
  360 IF A>135 AND A<140 THEN PROCe:G
OTO350
  370 IF A=135 Type%=Type% EOR 1:SOUN
D1,-15,100,1:GOTO350
  380 IF Type%=0 ?(Base%+MX%+(MY%*8))
=A:PROCp(12,Base%+(MY%*8)):A=137:PROC
e:GOTO350
  390 IF Type%=1 AND INSTR("012345678
9ABCDEF",CHR$(A)) OV%=INSTR("01234567
89ABCDEF",CHR$(A))-1+(16*(?(Base%+MX%
+(MY%*8)) AND 15)):?(Base%+MX%+(MY%*8
))=OV%:PROCp(12,Base%+(MY%*8)):GOTO35
0
  400 GOTO350
  410 ONERRORGOTO300
  420 CLS:PRINT'''"Press 'Y' to save
sector"''"       'R' to re-run program
   OR"''"       'Escape' to continue e
diting.":*FX15
  430 REPEAT:A$=GET$
  431 UNTIL INSTR("RrYy",A$)
  432 IF INSTR("RrYy",A$)<3 RUN
  440 !&7B00=&C0000:!&7B04=&4B0300:?&
7B07=Track%:?&7B08=Sector%:?&7B09=&21
  450 A%=&7F:X%=0:Y%=&7B:CALL&FFF1
  460 ONERRORRUN
  470 IF ?&7B0A<>0 THEN PRINT'''"Writ
e error !"''"NB. make sure there is n
o write protect"''"tab on the disc."'
''"Press 'Escape' to re-run program
OR"''"any other key to re-try." ELSE
500
  480 *FX15
  490 REPEAT UNTIL GET:GOTO440
  500 PRINT'''"Sector saved ..."'''"P
ress any key to continue":*FX15
  510 REPEAT UNTIL GET:RUN
  520 DEFPROCp(Y%,S%)
  530 VDU31,0,Y%
  540 PRINT~S%;" ";:FORM%=0TO7:IF M%?
S%<16 THEN PRINT;"0";~M%?S%;" ";:NEXT
 ELSE PRINT;~M%?S%;" ";:NEXT
  550 PRINT;"  ";:FORM%=0TO7:IF M%?S%
<32 OR (M%?S%>126 AND M%?S%<160) THEN
 VDU46:NEXT ELSE VDUM%?S%:NEXT
  560 ENDPROC
  570 DEFPROCc
  580 VDU31,MX%*3+4,12,133+Type%,9,9,
135
  590 ENDPROC
  600 DEFPROCAdd_string
  610 IF asc=127 AND Len<>0 THEN VDU1
27,127,255:String$=LEFT$(String$,Len-
1):Len=Len-1:GOTO640 ELSE IF asc=127
THEN VDU7:GOTO640
  620 IF Len=Max AND asc<>13 THEN VDU
7:GOTO640
  630 IF asc<>13 VDU127,asc,255:Strin
g$=String$+Inp$:Len=Len+1 ELSE Fin=TR
UE
  640 ENDPROC
  650 DEFPROCInput_int(Max)
  660 String$="":Len=0:VDU255:Fin=FAL
SE:REPEAT:REPEAT
  670 Inp$=GET$:asc=ASC(Inp$)
  680 UNTIL (asc>47 AND asc<58) OR as
c=13 OR asc=127
  690 PROCAdd_string
  700 UNTIL Fin=TRUE:VDU127
  710 A$=String$
  720 ENDPROC
  730 DEFPROCe
  740 ONA-135 GOTO 840,870,750,780
  750 IF Bot%-&60>=&F8 ENDPROC
  760 PROCec:Top%=Top%+8:Bot%=Bot%+8:
MY%=MY%+1
  770 VDU31,0,24,10: IF Bot%<=&F8 PRO
Cp(24,Bot%+Base%):ENDPROC ELSE PROCDe
lay:ENDPROC
  780 IF Top%+&60<=0 ENDPROC
  790 PROCec:Top%=Top%-8:Bot%=Bot%-8:
MY%=MY%-1
  800 VDU31,0,0,11:IF Top%>=0 PROCp(0
,Top%+Base%):ENDPROC ELSE PROCDelay:E
NDPROC
  810 DEFPROCec
  820 VDU31,MX%*3+4,12,32,9,9,32
  830 ENDPROC
  840 PROCec:IF MX%=0 AND MY%=0 THEN
MX%=7:ENDPROC
  850 IF MX%=0 THEN MX%=7:GOTO780
  860 MX%=MX%-1:ENDPROC
  870 PROCec:IF MX%=7 AND MY%=31 THEN
 MX%=0:ENDPROC
  880 IF MX%=7 THEN MX%=0:GOTO750
  890 MX%=MX%+1:ENDPROC
  900 DEFPROCDelay
  910 FORL%=1TO300:NEXT
  920 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

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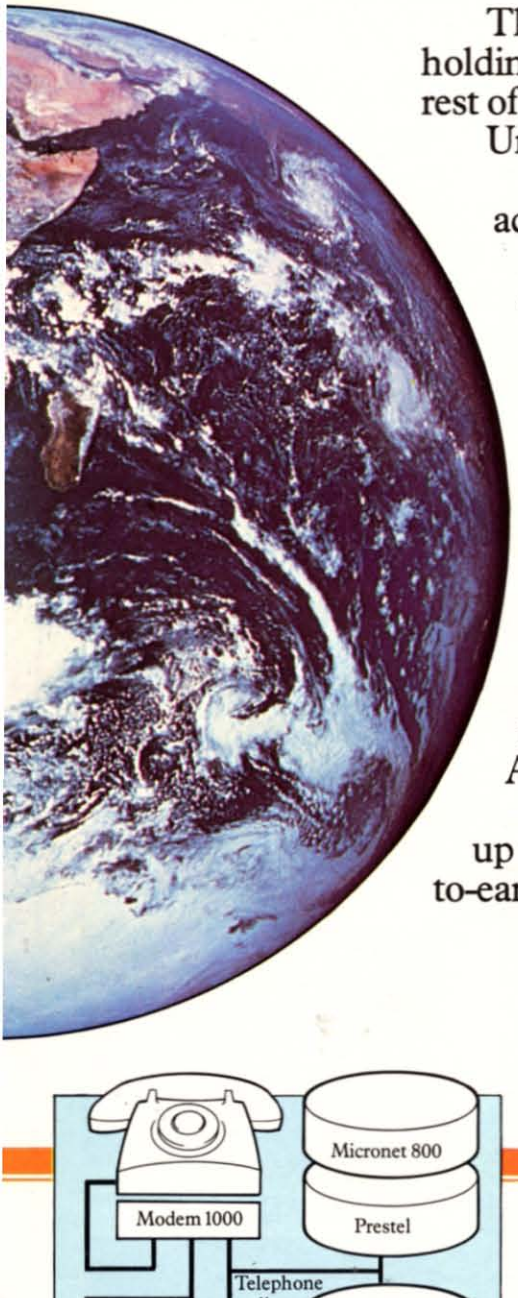

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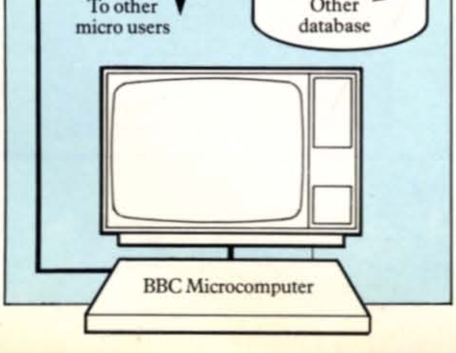

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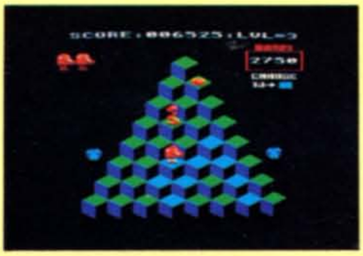
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2750

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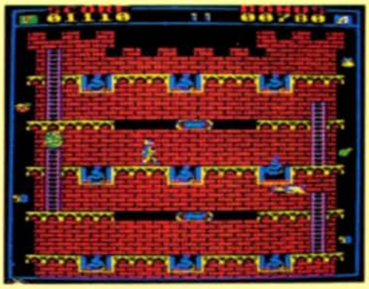
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BONUS 00700

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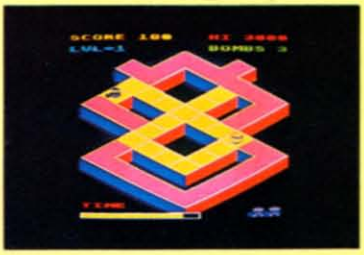
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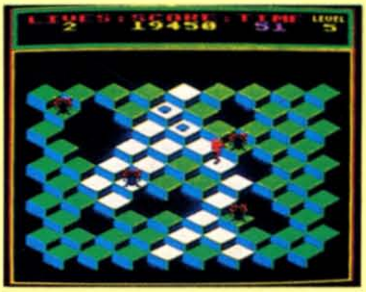
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ADVENTURE
2
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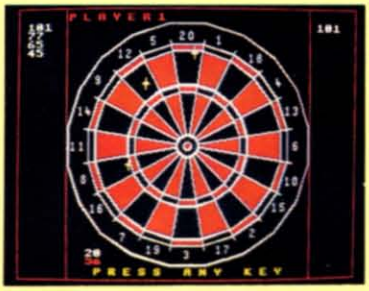
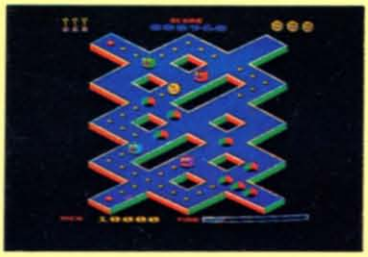

PLAYER1
101
PRESS ANY KEY

3-D MUNCHY



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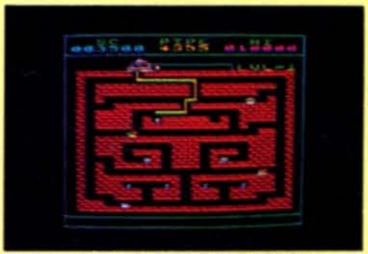

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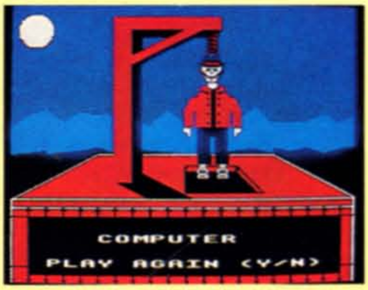
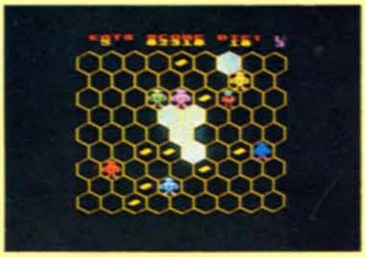

COMPUTER
PLAY AGAIN (Y/N)

GUY IN THE HAT



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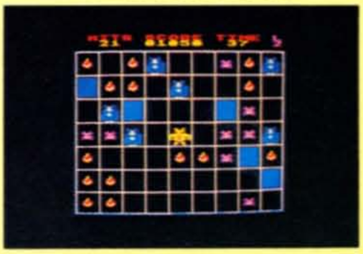

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Tap the BBC Micro's secrets and discover . . .

Four ports of call on the 1MHz bus route

THE BEEB BODY BUILDING COURSE

PART 17

By MIKE COOK

AS I have said on many occasions, one of the better features of the BBC Micro is the ease with which extra circuitry can be added.

In the past few months we have been attaching a wide variety of devices to the user port. But the snag is that the BBC Micro only has one user port and so you can only use one add-on at a time.

In some later articles I would like to explore what some of our Body Build projects can do when they work together, so this month we will look at a way of adding more user ports.

The BBC Micro has an important interfacing channel that we have not looked at so far in this series – the 1MHz bus. This is a collection of lines that allow you to tap into 512 bytes of the computer's memory map.

The lines are the data bus and eight lines of the address bus along with some control signals. The bus occupies memory locations from &FC00 to &FDFF.

Special address decoding carves out this space in the operating system ROM. So when the microprocessor accesses these memory locations the ROM is switched out and the 1MHz bus is accessed.

The space in the ROM that is switched out – and so can never be seen by the micro – contains copyright notices and a list of names of those who developed the BBC computer. Normally there is no device at this address and if you try to read any location you will see the value &FF. That is because all the data lines have nothing connected to them and so float high.

Even if you try to write anything to them you will still see the same number because there is physically no memory in that address space.

Acorn have decided in their own mind what devices will occupy specific addresses on the bus and, as they have condescended to allocate us mere mortals a few scraps of space, we should humbly comply with their wishes.

However at the very first sign that this is starting to hinder or restrict us, then it's every computer designer for himself.

We can split up the space on the bus into two pages (256 byte blocks). The page whose addresses begin with the value &FD is known as JIM and the other page, starting with the value &FC, is called FRED.

The only relevance in these names is to inform us that the design team responsible for this part of the machine were Goons fans. However it serves to distinguish them in a user friendly way.

&FC00-&FC0F	Test hardware
&FC10-&FC13	Teletext
&FC14-&FC1F	Prestel
&FC20-&FC27	IEEE 488 interface
&FC28-&FC2F	Any other Acorn products
&FC30-&FC3F	Cambridge Ring Network
&FC40-&FC47	Hard disc interface
&FC48-&FC7F	Anything we could not fit in at &FC28
&FC80-&FC8F	More test hardware
&FC90-&FCBF	Again reserved for Acorn
&FCC0-&FCFE	At last – user applications
&FCFF	Latch to hold page number for paged memory

Table I: Acorn recommended address locations

Incidentally, if there is anyone with a printable explanation of why page &FE is called SHEILA, I would be pleased to hear it.

It has been said from on high that thou shalt reserve JIM for paged memory, and it shall be so, whereas FRED may be used for peripherals.

Table I shows the suggested allocations from Acorn and there is no truth in the rumour that they were originally produced on tablets of stone.

It acts as a guide, the overriding consideration being no two devices connected to the same machine can have the same address.

In the device we are going to build, we can easily change a link to change the address it maps to.

The user port on the BBC Micro is the B side of a 6522 VIA (Versatile Interface Adapter). The A side is used for the printer and the C side does not exist – except at Blackpool . . .

The VIA allows any bit on a port to be programmed as an input or an output. In addition the B side contains two timers and a shift register.

While other computer input/output devices can be used, I decided to use the VIA so that it is completely compatible with the user port. The only thing which needs changing is which address locations are used.

As the user port extension card will be attached to the 1MHz bus and consist of two VIAs, you might as well attach two while you are at it. This will give a total of four ports.

I gave great thought to how I should configure the connectors. The B sides should of course be wired up to header plugs in exactly the same way as the user port so that the same device may be plugged into any.

With the A side of each port the choice was not so clear cut. It could be wired up like the printer port. But on the micro the printer port has buffers in series with each line. This makes the

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THE BEEB BODY BUILDING COURSE

From Page 117

port able to drive heavier loads but restricts it to output only.

Any device working on the printer port may present too heavy a load to be driven by the port expansion card.

However the A side is not an exact equivalent of the B side as the loads driven cannot be as heavy and there are no timers or shift registers.

Most of the time this will not matter – no Body Build project has demanded these yet – and so I decided to wire one of the A sides like the conventional user port and the other to screw terminals allowing single lines to be easily connected.

If you are making your own board you can alter this if you like.

Having decided what we want from the board how do we set about designing it? Well if we look at Page 503 of our User Guide, we will see all the connections on the bus.

Designing the port expansion board is just like designing a whole computer, only in miniature.

All the data bus lines on the VIAs go to the data bus lines – D0 to D7 – on the 1MHz bus. These are the wires used to transfer information back and forward between the VIAs and the microprocessor.

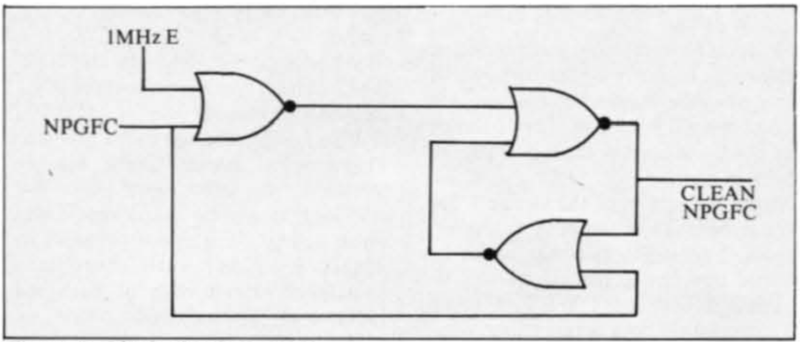

Figure 1: Glitch clean up circuit

The microprocessor asks to access an address by putting its value on the address bus. This bus consists of 16 wires but only eight of them are brought out to the 1MHz bus socket. These are the low order lines A0 to A7.

The high order lines A8 to A15 are decoded by logic gates inside the micro so that whenever they contain &FC or &FD then one of the page enable lines goes low.

You can see the design team responsible for labelling these lines were not Goons fans as they are labelled NPGFC and NPGFD, standing for Not PaGe &FC and Not PaGe &FD.

The NOT means that when the page

→

```
   10 MODE 1
   20 PRINT TAB(8,2);"OPERATION OF A F
LIP-FLOP"
   30 PRINT SPC(13);"By Mike Cook"
   40 PRINT TAB(0,23);"Press the R or
S keys"
   50 VDU 23,1,0;0;0;0;
   60 DIM NOR%(15,1),WX%(3,3),WY%(3,3)
   70 OUT1=TRUE
   80 OUT2=FALSE
   90 VDU19,2,4,0,0,0
  100 FOR N=0 TO 14
  110 READ NOR%(N,0),NOR%(N,1)
  120 NEXT
  130 FOR N=0 TO 3
  140 FOR M=0 TO 3
  150 READ WX%(M,N),WY%(M,N)
  160 NEXT
  170 PROC_WDRAW(N,0)
  180 NEXT
  190 GCOL 0,3
  200 PROC_NORDRAW(500,400,1)
  210 PROC_NORDRAW(668,650,-1)
  220 PRINT TAB(8,18);"R"
  230 PRINT TAB(29,8);"S"
  240 REM NOW TO START THE LOGIC
  250 REPEAT
  260 R=INKEY(-52)
  270 *FX19
  280 *FX19
  290 IF R THEN PRINT TAB(10,18);"1" E
LSE PRINT TAB(10,18);" "
  300 PROC_WDRAW(2,R)
  310 S=INKEY(-82)
  320 *FX19
  330 *FX19
  340 IF S THEN PRINT TAB(27,8);"1" EL
SE PRINT TAB(27,8);" "
  350 PROC_WDRAW(3,S)
  360 OUT1=NOT(S OR OUT2)
  370 OUT2=NOT(R OR OUT1)
  380 *FX19
  390 *FX19
  400 PRINT TAB(12,13);
  410 IF OUT1 THEN PRINT"1" ELSE PRINT
"0"
  420 PROC_WDRAW(1,OUT1)
  430 *FX19
  440 *FX19
  450 PRINT TAB(24,14);
  460 IF OUT2 THEN PRINT"1" ELSE PRINT
"0"
  470 PROC_WDRAW(0,OUT2)
  480 UNTIL FALSE
  490 DEF PROC_NORDRAW(X,Y,I)
  500 MOVE X,Y
  510 S%=0
  520 N=0
  530 REPEAT
  540 PLOT 0,I*NOR%(N,0),0
  550 PLOT 17,I*NOR%(N,1),0
  560 Y=Y+4
  570 MOVE X,Y
  580 IF S%=0 THEN N=N+1 ELSE N=N-1
  590 IF N=14 THEN S%=1
  600  UNTIL N<0
  610 ENDPROC
  620 DEF PROC_WDRAW(N,C)
  630 IF C THEN GCOL 0,1 ELSE GCOL 0,2
  640 MOVE WX%(0,N),WY%(0,N)
  650 FOR A%=1 TO 3
  660 DRAW WX%(A%,N),WY%(A%,N)
  670 NEXT
  680 ENDPROC
  690 DATA 0,72,4,80,8,88,12,96
  700 DATA 14,104,16,112,16,120
  710 DATA 16,124,18,128,20,128
  720 DATA 24,128,24,130,24,132
  730 DATA 24,136,24,144
  740 DATA 668,456,750,456,750,674,656
,674
  750 DATA 500,706,438,706,438,484,512
,484
  760 DATA 512,424,512,424,370,424,370
,424
  770 DATA 656,738,656,738,850,738,850
,738
```

Listing 1: The operation of an RS flip-flop

THE BEEB BODY BUILDING COURSE

From Page 119

is selected, this line goes to to a logic zero.

In order for a device to respond it requires all its Chip Select lines to be at the correct level. The VIA has two lines CS1 (needs to be high) and $\overline{CS2}$ (needs to be low).

In addition the VIA has 16 internal registers. In order that these should appear in consecutive address locations the register select lines are normally connected to the lower order lines on the address bus.

If you swapped these lines about then the internal registers would appear in a different order. Not even Acorn decided to do this.

A line is necessary to tell the VIA to put data onto, or to collect data from, the data bus. This is the read not write line ($R/\overline{W}$) as, when it is high the microprocessor wants to read information and when it is low it wants to write it.

All data transfer with the 6502 microprocessor takes place in synchronism with a signal known as the E signal (or Enable). As the processor is running at 2MHz the real E signal is also at 2MHz.

For the purposes of the 1MHz bus the frequency of this signal is divided in half to produce a 1MHz E signal – this is where the bus derives its name. This halving of the E signal can lead to some slight complications.

The NPGFC line is derived from gates whenever there is the value &FC on the higher order address lines. The address lines are valid only when the real E line (the 2MHz one) is high.

The 1MHz E line will be high while the 2MHz line goes through one cycle (high and low times) and so it is possible that the NPGFC line will have false spikes on it.

That is caused while the address bus is changing from one combination to another. The one we are looking for accidentally (and falsely) occurs briefly. In jargon terms this is known as an address decoding glitch.

The way around these glitches is to allow the NPGFC line to activate the device on the bus when the 1MHz line is high. This can be done by using the circuit shown in Figure I.

This uses three NOR gates arranged in a flip-flop. As we have not come across these terms yet, let us look at them a little closer.

A NOR gate is a Not OR gate. This means there is an OR function – the output is true if one OR the other is true – and then the function is inverted. Hence the phrase "get NOTted" refers to you being inverted.

Suffice it to say that, with a NOR gate, if any input is at a logic one then the output is at a logic zero. Conversely both inputs have to be at a logic zero to get a logic one output.

The flip-flop is the simplest form of memory. It has two stable states and is driven into the states by applying a logic one to either of its inputs. By looking at the output you can tell which input was last driven.

The action of a flip-flop is really quite simple, but sounds terribly complicated when described in words. My students could never understand it until they had a practical demonstration, so I will not write it down.

As you have the means of producing a moving diagram on your computer, I have written a program to illustrate the action of an RS flip-flop. This is shown in Listing I. Just press the R or S keys to see it in action.

Note the action of the circuit – see how it behaves in response to various inputs. You will notice that it can be pushed into one of two states.

Also if both keys are held down simultaneously both outputs go to zero. This is not a stable position as the last input to be released will in effect drive the flip-flop.

The inputs are labelled R and S to stand for Re-set and Set and these give the name to this configuration – RS flip-flop.

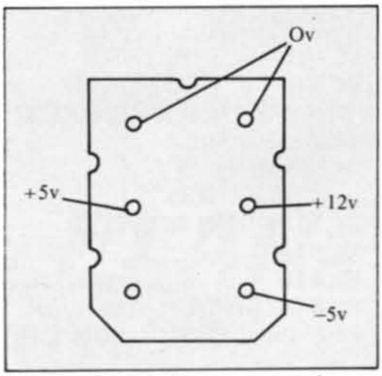

Figure III: Auxiliary power socket on the BBC Micro

Link	Address
0	&FC00-&FC1F
1	&FC20-&FC3F
2	&FC40-&FC5F
3	&FC60-&FC7F
4	&FC80-&FC9F
5	&FCA0-&FCBF
6	&FCC0-&FCDF
7	&FCE0-&FCFF

Table II: Link to make for specific block

You can see from Figure I that we have got slightly more than an RS flip-flop as we will apply the R signal only when 1MHz is low and NPGFC is low.

The S signal is applied when NPGFC is high. Therefore any address decoding glitches which occur when the 1MHz is high do not get through to the flip-flop. The memory action of the flip-flop holds the page select signal low if it is activated at a time when the 1MHz signal is high. The micro stretches its 2MHz E signal until there is a coincident falling edge of both the 1MHz and 2MHz signals.

Without the flip-flop, this can have the effect of double accessing a device which could clear a flag before you see it has been set.

The full circuit of the port expansion card is shown in Figure II. It contains all the elements we have discussed so far plus some address decoding.

The address lines A5-A7 are fed into a 74LS42 decoder circuit. We used one of these in the real time clock.

Here it is used to provide a logic zero on one of its eight outputs when any combination is produced on the address lines and there is a clean NPGFC signal from the flip-flop.

We can use any of these outputs to enable our VIA. By moving the link to another output, we can simply move the address where our VIAs will appear in page &FC (FRED).

Table II shows the relationship between link position and address.

Each VIA occupies 16 bytes of memory but the address decoding is in blocks of 32 bytes. So address line A4 is used to determine which VIA is to be activated.

It is taken to the active low enable on VIA 1 and the active high enable on VIA 2. In this way only one VIA is enabled at once. This leaves the other enable input free to be used by the address decoding circuit.

As we have one enable input of each

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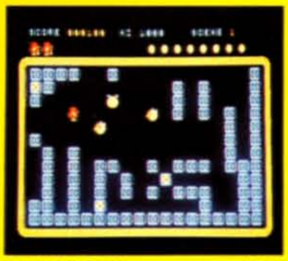
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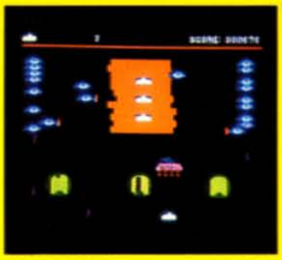
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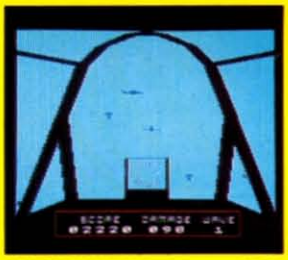
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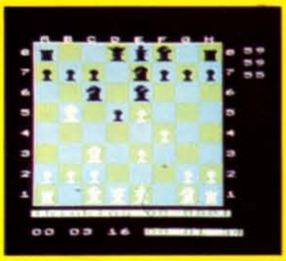
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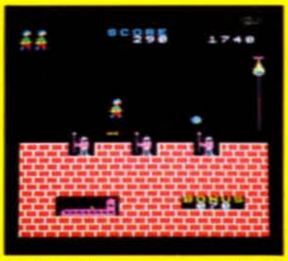
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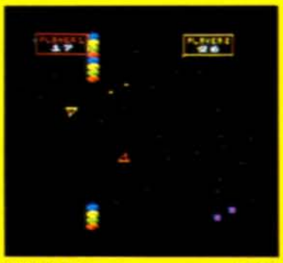
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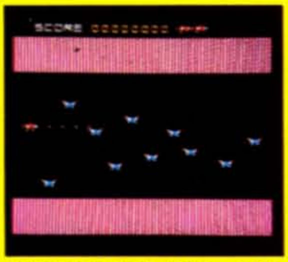
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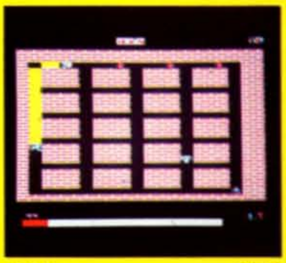
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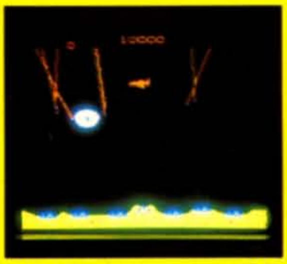
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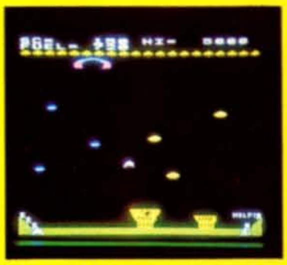
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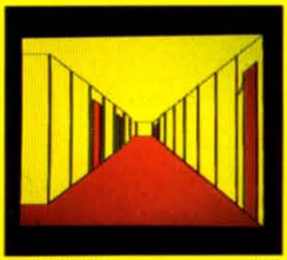
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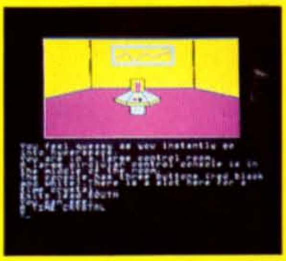
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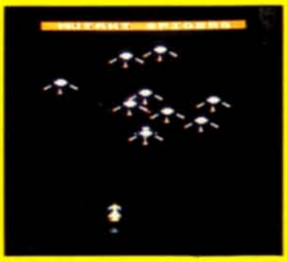
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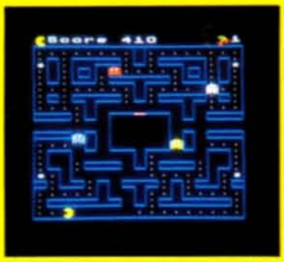
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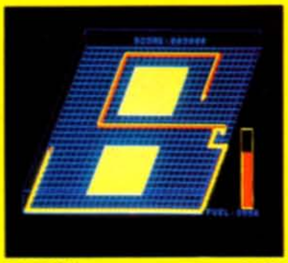
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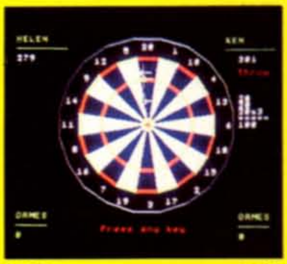
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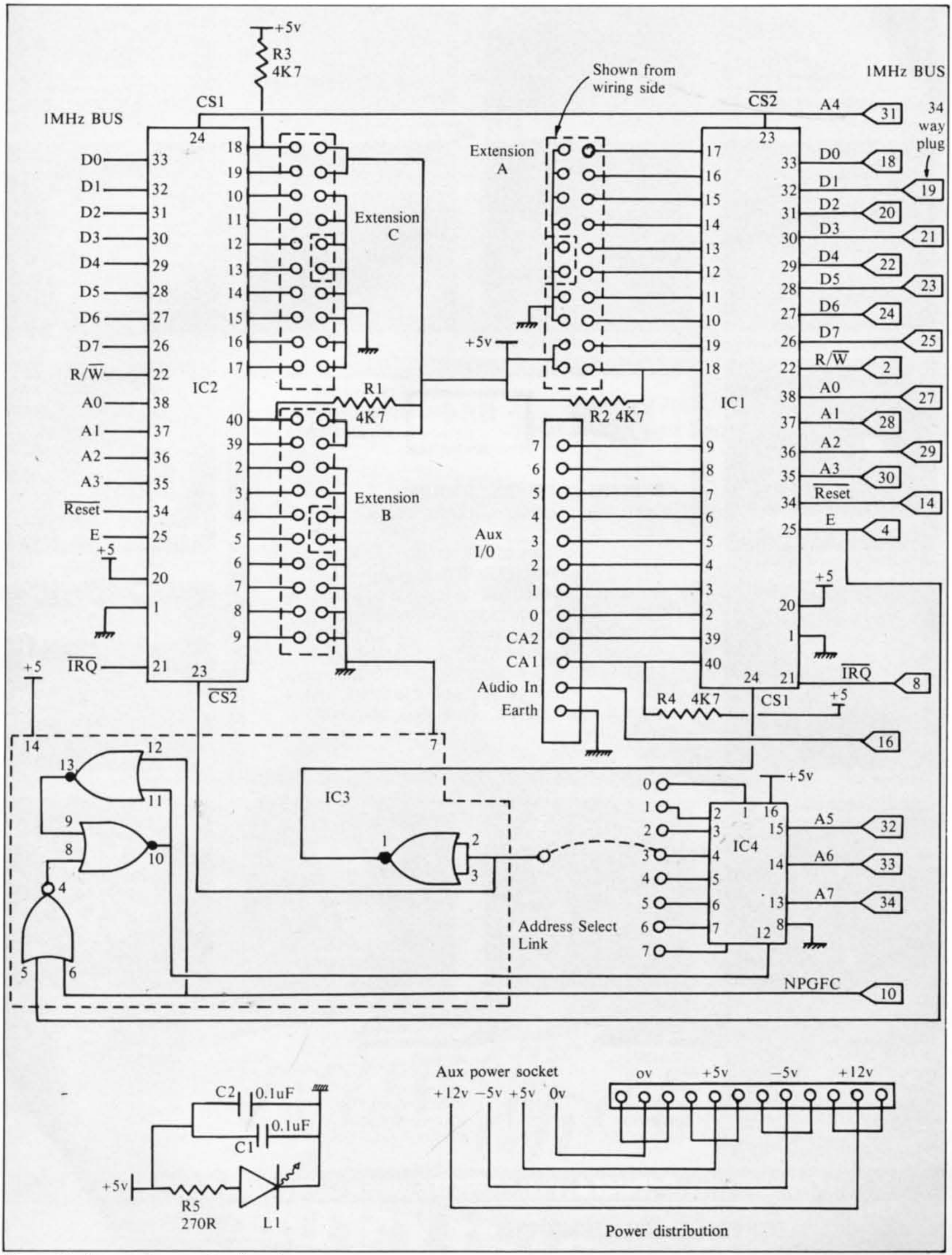

+5v
R3
4K7
CS1
1MHz BUS
Shown from
wiring side
1MHz BUS
CS2
A4
31
34
way
plug
24
23
D0
D1
D2
D3
D4
D5
D6
D7
R/W
A0
A1
A2
A3
Reset
E
+5
IRQ
IC2
Extension
C
Extension
B
Extension
A
R1
4K7
R2 4K7
+5v
Aux
I/0
7
6
5
4
3
2
1
0
CA2
CA1
Audio In
Earth
IC1
R4 4K7
CS1
IRQ
CS2
IC3
Address Select
Link
IC4
A5
A6
A7
NPGFC
+5v
18
19
20
21
22
23
24
25
2
27
28
29
30
14
4
8
16
32
33
34
10
C2
0.1uF
C1
0.1uF
+5v
R5
270R
L1
Aux power socket
+12v
−5v
+5v
0v
ov
+5v
−5v
+12v
Power distribution

Figure II: User port expansion board

THE BEEB BODY BUILDING COURSE

From Page 120

sense, we have to invert the output to one VIA, conveniently achieved by the spare gate in the 74LS02.

As there is no power on the 1MHz bus connector it has to be taken from the auxiliary power socket on the underside of the micro.

This is a great opportunity to make a power distribution connector so that you can easily power other low current circuits at the same time. Alternatively it is perfectly feasible to use an external power supply if the one in your micro is under too much strain.

Figure III shows the pin-out of the auxiliary power socket.

There is also one other input connected to the 1MHz bus plug although it has nothing to do with the bus.

This is an audio input for the built-in amplifier and speaker. It can be quite useful when adding circuits that make a noise of some sort such as speech synthesisers, and so it is brought out to a screw connector.

Construction of the board is straightforward although this board is the first one we have used that needs to be double sided with plated-through holes. Unfortunately this makes it more expensive.

However the construction is as simple as ever. Just locate the components on the board, slot them in and solder them up.

A flying lead provides the connection to the auxiliary power socket and the complete kit or ready built-up version can be obtained by using the order form on Page 126.

The board is a standard Euro Card size roughly about 4in by 6½in – only it's in nasty metric units. This is a standard size and allows the board to be mounted in a card frame rack.

This will allow several boards to be used at once. These racks do tend to be expensive but they can be quite convenient.

Now there is a whole list of good advice from Acorn in the Advanced User Guide about standards to which all hardware designed for the 1MHz bus *must* conform.

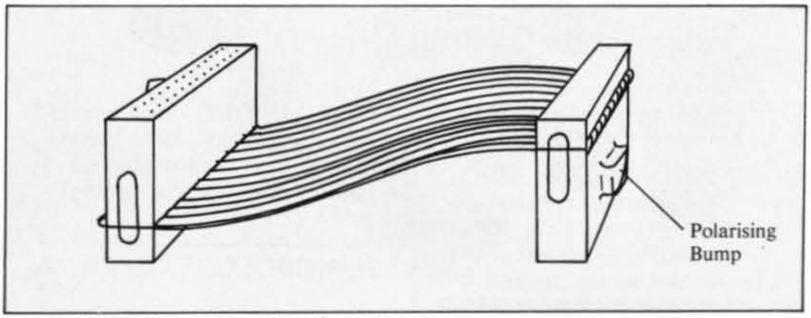


Figure IV: Cable configuration for 1MHz bus.

```
   10 MODE 7
   20 PRINT TAB(3,2),"Body Build PORT
EXTENDER Test"
   30 PRINT SPC(11);"By Mike Cook"
   40 PRINT
   50 PRINT
   60 DIM PORT%(4),D$(4)
   70 REPEAT
   80 INPUT"ENTER LINK POSITION (0-7)"
L%
   90 UNTIL L%<8
  100 VDU 23,1,0;0;0;0;
  110 BASE%=&FC00+L%*16
  120 FOR A%=1 TO 4
  130 READ B%,D$(A%)
  140 PORT%(A%)=BASE%+B%
  150 ?(BASE%+C%+2)=0
  160 NEXT
  170 REPEAT
  180 PRINT TAB(0,5)
  190 FOR B%=1 TO 4
  200 PRINT TAB(4);"INPUT AT ";D$(B%);
" &";~PORT%(B%)
  210 PRINT SPC(10);"7 6 5 4 3 2 1 0"
  220 P%=?PORT%(B%)
  230 PRINT SPC(10);
  240 A%=128
  250 REPEAT
  260 IF (A% AND P%) THEN PRINT "1 ";
ELSE PRINT "0 ";
  270 A%=A% DIV 2
  280 UNTIL A%=0
  290 PRINT
  300 PRINT
  310 NEXT
  320 UNTIL FALSE
  330 DATA 1,"AUX CONNECTOR",0,"EXTENS
ION A",17,"EXTENSION B",16,"EXTENSION
C"
```

Listing II: Port expander test program

The degree of seriousness we can attach to this is indicated when we look to see if Acorn themselves adhere to such *standards* in their 1MHz products. Needless to say, they don't!

One particular gem is that each board must have two 34-way plugs wired in a feed-through arrangement to allow more devices to be connected as required.

This is all very well but it does make the printed circuit layout quite complex, and I failed to find one on the Teletext adapter or the IEEE interface.

The solution to adding more boards is easily solved by adding extra sockets onto the ribbon cable.

As these are the IDC – Insulation Displacement Connector – type you simply clip on another connector in mid position and squeeze in a vice. This allows daisy chaining of many devices.

If you already have a Teletext adapter, you can add a header on the cable for it to plug into.

So along with Body Build Pack 15 you will need Pack 16 which contains a length of 34-way ribbon cable and one socket. The other socket is included in Pack 15, as it will be in future packs that use this bus.

In this way you need to buy one Pack 16 and as many of Pack 15 as you need – they will all clip onto the same cable.

The cable for the bus, unlike the user port cable, is connected correct way round. That is, the connections should be made to the same pin on each socket.

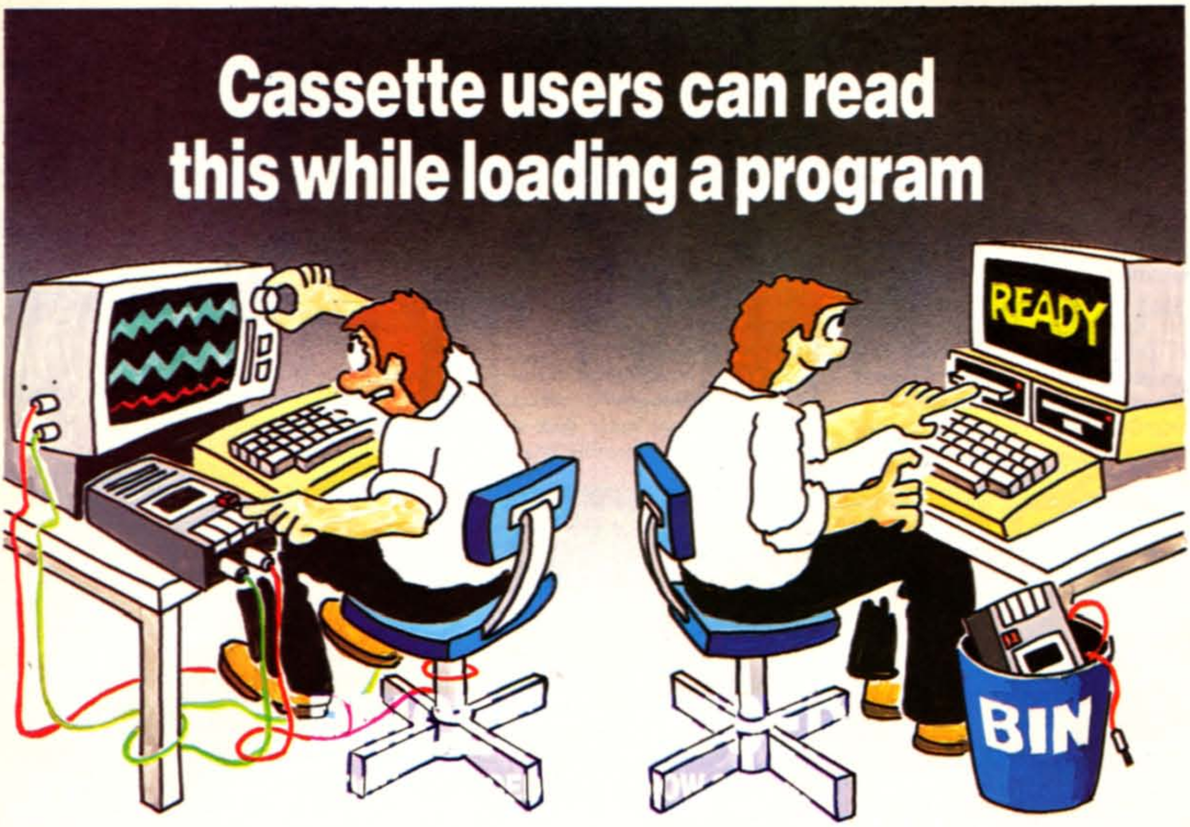
To do this the sockets must be pointing in opposite directions on the cable. Study Figure IV carefully before clamping up the cable.

Having constructed the port expander board it is time to test it. Listing II shows a program to do this. It first asks you what link you have made on the address decoding circuit.

This will alter the position of the board in page FRED. If you are using

→

Cassette users can read this while loading a program



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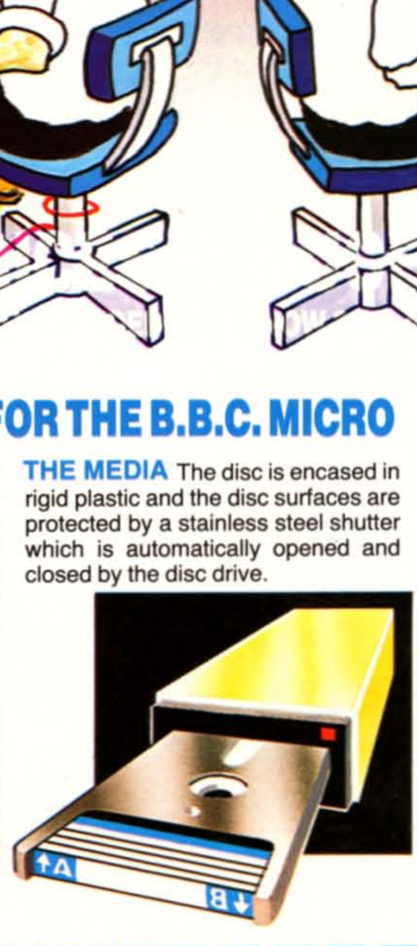

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THE BEEB BODY BUILDING COURSE

From Page 123

two or more boards there must be different links made on each board.

The program then programs all the data pins on the VIAs to be inputs. Each port is read in turn and the bit pattern is displayed.

With nothing connected all the bits will be shown as "1". This will also be the case if you have entered the wrong link number or have not connected the board up.

Take a small piece of wire and connect it to an earth (0 Volt) point. Then take the other end of the wire and touch each of the data lines on the auxiliary connector. You should see the appropriate bit go to logic zero.

Repeat this for the other ports, use the user port connector board (Body Build Packs 1 and 2) if you have it, otherwise touch the pins on the header directly.

Take care not to touch the +5 volt connection or you will cause the computer to crash by shorting out the supply.

I have done this on several occasions without any damage to the machine but I make no guarantees that you can.

The board may now be used with any equipment that normally plugs into the user port. But bear in mind that the software will have to be changed to reflect the new address you are using.

Also note that Extension B is in fact the A side of the VIA and so will not work with equipment that requires the timers or the little extra "umph" available on the B side.

Nevertheless it should work with most devices.

So now the BBC Micro has been equipped with lots of extra inputs and outputs.

You no longer have to decide whether you will use the real time clock, dual cassette system, fast A/D converter or even commercial equipment like the excellent Chameleon colour palette that allows you to completely re-define all the colours produced by the computer. (Modesty prevents me telling you who designed it!)

You can use them all and still have room for next month's project which is ... no, wait and see.

Component list for Body Build Pack 15: **IC1 IC2 6522 VIA, IC3 74LS02, IC4 74LS42, C1 C2 0.1 uF Disc ceramic, R1-R4 4K7, R5 270R, L1 Red LED, 3 20-way IDC plug straight pins, 2 12-way screw terminal blocks, Aux power supply plug, 1 yard 4-way cable, 2 40-pin DIL sockets, 16 pin DIL socket, 14 way DIL socket, 34-way IDC plug angled pins, 34-way IDC socket bump polarised, printed circuit board.**

Component list for Body Build Pack 16: **34-way IDC socket bump polarised, 1 yard 34-way ribbon cable.**

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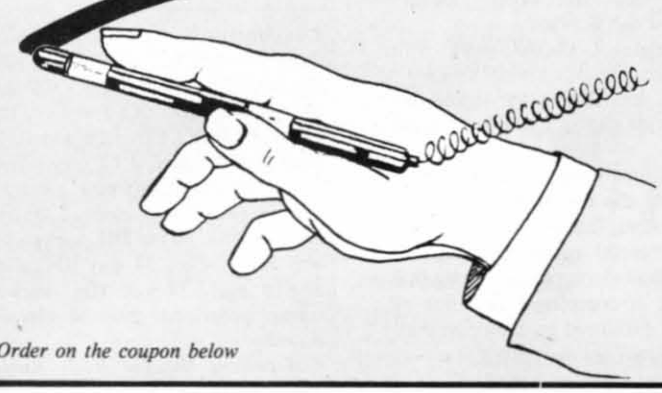

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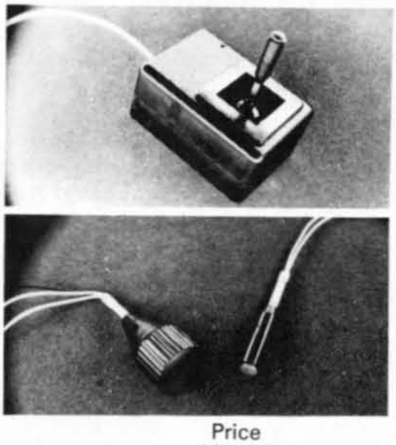

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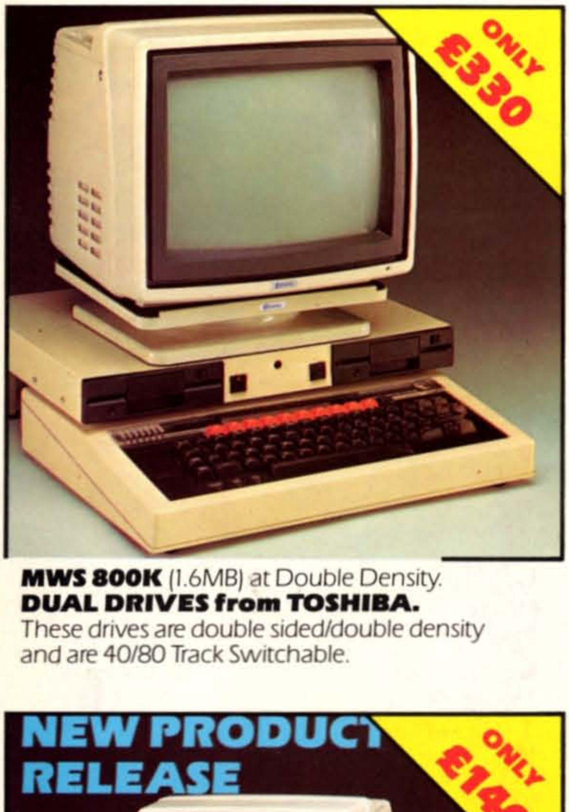

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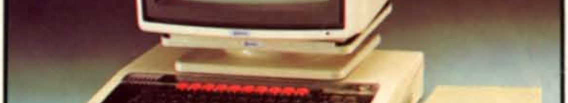

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The intervening part of the program display is then sent to the screen and also directed character by character to the printer.

If your display involves graphics or specially created enlarged text characters, then the job is not quite so straightforward.

First of all you will need a printer with dot addressable graphics capabilities – for example a dot matrix printer – and also a program routine which will examine each dot or pixel of the screen display in memory and send them all item by item – that is, dump them – to the printer.

The screendump routine can be attached as a procedure to the main program, which is often a nuisance if it is only occasionally required, or even impossible on some commercial software. Or it can be placed as a machine code routine in a relatively safe place elsewhere in memory prior to loading the main program.

The dump may then be activated by a CALL to the routine.

As a reminder to those unfamiliar with memory locations on the BBC Micro, safe areas for the dump routine would be around &D00 on cassette

DUMPS

By MIKE MAHON

Epson Dump ROM

Watford Electronics

THIS screen dump utility is designed specifically for the popular range of Epson FX and RX dot matrix printers – which in themselves offer a wide range of printing facilities.

On first opening the box in which the ROM arrived I thought I had lost, or had not received, the instruction manual. However, at the top of the sheet of ROM fitting instructions was this ROM's single command *SCDUMP without any extra parameters.

I will therefore have to give this ROM 10 out of 10 for ease of use and user friendliness!

In addition, three screens of comments are available on the chip itself and are accessed by *HELP SCDUMP.

The first page gives details of the print tones available in use with each mode. The other two suggest how to call the ROM from a machine code program by using OSWORD &BB – that is, LDA# &BB and JSR&FFF1.

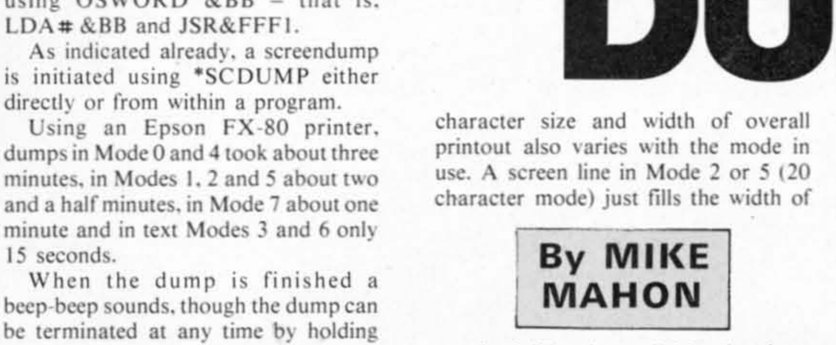
As indicated already, a screendump is initiated using *SCDUMP either directly or from within a program.

Using an Epson FX-80 printer, dumps in Mode 0 and 4 took about three minutes, in Modes 1, 2 and 5 about two and a half minutes, in Mode 7 about one minute and in text Modes 3 and 6 only 15 seconds.

When the dump is finished a beep-beep sounds, though the dump can be terminated at any time by holding down the Escape key.

As the resolution of characters and the availability of colours varies with the screen mode, so does the type of printout. Text character quality is excellent in Modes 0, 3, 4, 6, 7, and acceptable in Modes 2 or 5 but is awful in Mode 1 (see Figure I).

It must also be remembered that character size and width of overall printout also varies with the mode in use. A screen line in Mode 2 or 5 (20 character mode) just fills the width of standard 80 column (21.5cm) printer paper.



MODE 3/6 Screendump

MODE 0 Screendump

MODE 7 Screendump

MODE 1 Screendump

MODE 4 Screendump

MODE 2/5 Screendump

Figure I: Epson Dump text

The most useful and enjoyable feature of the Epson Dump ROM compared with simple screendump routines is its multitone printing of colours.

Each of the BBC Micro colours is represented by a different tone or pattern of dots on the printout giving an impressive seven tone dump in Mode 2 (Figure II). In Modes 1 and 5, a four tone dump may be achieved and in other modes a single tone.

I found this feature especially useful when dumping bar charts and histograms with overlays in different colours (tones), for designing posters (Figure III), or simply for making impressive paper copies of many of the fabulous graphic displays available from software written by others.

Some interesting additional tonal effects may also be created by mixing colours – for example red and yellow to make orange – as is available on some of the recent extended graphics ROMs such as the Addcomm chip.

The Epson Dump ROM is also capable of producing a printout of both the text and graphics of Mode 7 screens. This is particularly useful as much BBC software utilises this mode in order to save memory.

In addition, if the user has a teletext adapter, dumpouts of saved teletext screens from Ceefax and Oracle may be produced. For example, I particularly enjoyed carrying around a printout of the day's weather map on one occasion.

There is, unfortunately, one deficiency in the Mode 7 dump. It does not produce a tonal effect of colours and systems or &A00 on disc systems, although these may well be used by various added service chips.

The screen memory locations which are actually being read and dumped to the printer will vary with the mode in use, as shown in Table I, and in some modes fairly large chunks of memory need to be shifted requiring a reasonably fast dump routine.

Mode	Start	End	Length
0,1,2	&3000	&7FFF	20k
3	&4000	&7FFF	16k
4,5	&5800	&7FFF	10k
6	&6000	&7FFF	8k
7	&7C00	&7FFF	1k

Table I: Screen memory addresses on a 32k BBC Micro

Furthermore, the way in which screen memory is organised and read varies somewhat between the graphics modes and text modes and is entirely different in teletext Mode 7.

You may therefore require different routines for different modes as well as for different printers, and there are certainly very few Mode 7 dumps about.

All this talk of memory locations and variability of dump routines is enough to deter many would-be users. So a number of screendump utilities have recently come to the rescue, offered as firmware on sideways ROMs.

Two such utilities from Watford Electronics – the Mecca of the BBC sideways ROMS – are reviewed here. Just how easy are they to use and what facilities do they offer?

TO THE RESCUE

is therefore not as versatile as when used in other modes for graphics effects.

Finally, I am always curious to see what coding is actually on a new ROM. The facility of Epson Dump only uses about 5k of the available 8k so the sense of humour (I hope!) of the people at Watford filled in some of the rest. Suffice it to say, software pirates beware!

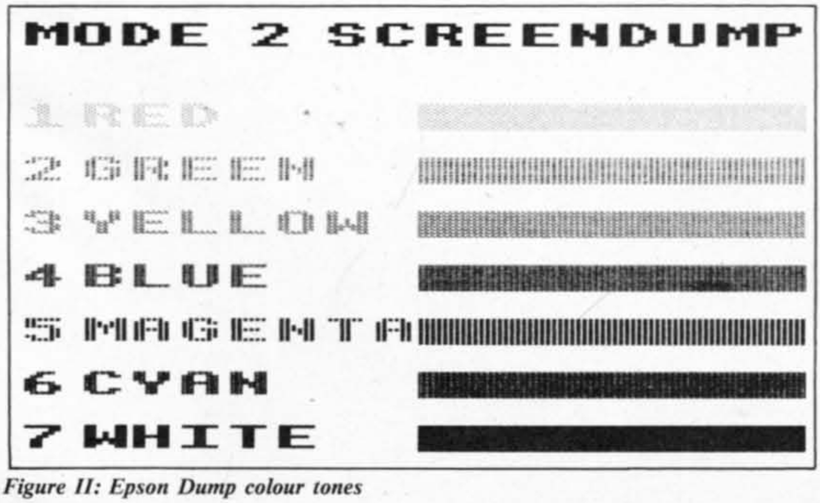


Figure II: Epson Dump colour tones

Dumpout 2
Watford Electronics

VERSATILITY is the main feature of this screendump utility.

Unlike the Epson Dump ROM, this one has three commands available – *SIMAGE, *LIMAGE, *CIMAGE – with up to four specifiable parameters in their syntax.

Thus it is more complex to use than the previous ROM and a few reads of the five page instruction manual are advised. Some details may also be accessed by the usual *HELP facility.

The first parameter to specify in each of the three commands is the type of printer being used. Thirteen printers from five major manufacturers are catered for – see Table II – which should cover most users.

Seikosha	GP80/100/250
Tandy	LPVII, DMP100/120/200/400
NEC	PC802x
Epson	MX/RX/FX
Star	

Table II: Printers supported by Dumpout 2

For this review commands were tested on the Epson FX-80 to enable direct comparisons with the Epson Dump ROM.

The most comparable command to Epson Dump's *SCDUMP on this chip is *CIMAGE EP, which produces an almost identical large size multitone printout simulating the colour screen display.

Thus in Mode 2, seven tones were available, two of which – those for red

→

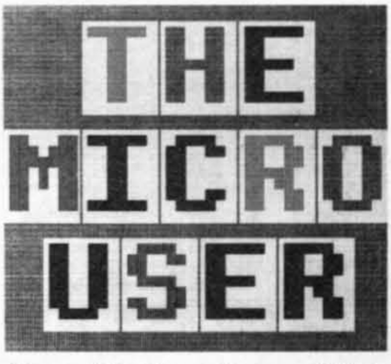


Figure III: Epson Dump multitone version of a Micro User poster

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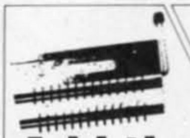

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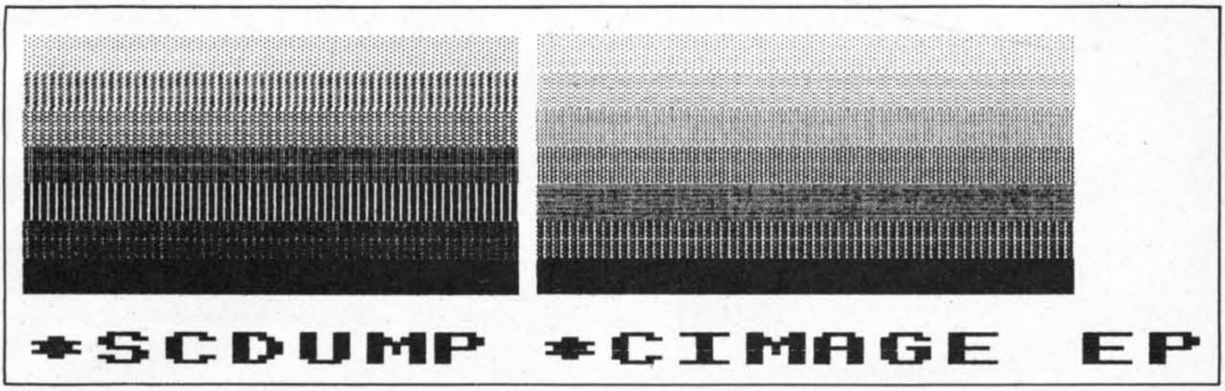

Figure IV: Epson Dump v Dumpout 2 tones

From Page 135

and white – were identical to those on the Epson Dump, and the others varied a little in their dot makeup.

In general the tones from Dumpout 2 were more subtle in their graduations than from Epson Dump (Figure IV) and make for better continuity in pictorial displays.

The Epson Dump tones, however, may be more suitable in bolder graphic art work.

The other two commands *LIMAGE and *SIMAGE produce a large or small single tone (black) dump respectively. The picture size produced by *LIMAGE, *CIMAGE and Epson Dump's *SCDUMP are identical.

The dump produced by *SIMAGE is about 30 per cent of the area produced by the other commands and may be quite useful if you want to put a few full screen dumps on a single page.

This small size dump takes about the same time as the Epson Dump ROM but the other two – *LIMAGE and *CIMAGE – are tediously slow, taking over six minutes to produce a Mode 2 screendump.

Fortunately, if you change your mind mid-dump, printout may be abandoned by holding down the Escape key.

Dumpout 2 has two further tricks up its sleeve. The first is that with each of the three commands the starting screen line (top) and finishing screen line (bottom) to be dumped may be specified.

This allows, for example, a pictorial portion of a screen to be printed without including any unwanted headers or footers containing instructions.

The second option, only available with *SIMAGE and *LIMAGE, is the facility to mask or select which colours are printed black and which are left unprinted as white.

DUMPOUT 2 REVERSED

Figure V: Dumpout 2 reverse characters

This was quite useful in producing reverse negative-like images on the printout with, for example, white letters on a black background (Figure V).

Unfortunately both these additional parameters may only be specified in hexadecimal and, especially the masking, take some thought. They are, however, well worth having available.

Dumpout 2 supports screendumps from Modes 0, 1, 2, 4 and 5. But, despite all its extra facilities in comparison to Epson Dump, this chip lacks a Mode 7 screen dump.

Curiosity again, but no special messages this time, though this chip also has plenty of room to spare as only about 3k is used for coding the dumpout facility.

Conclusion

BOTH chips worked happily alongside each other and with eight other sideways ROMs including the DFS with no incompatibility problems, though there was some tendency to overheating or underpowering corruptions when all 10 chips sat in my Watford sideways ROM extension board – the old version – at the same time.

Overall I found the Epson Dump ROM to be a superb utility which I thoroughly enjoyed using though there is still some room for improvement in the area of Mode 7 colours. For under £20 it represents good value for money.

Dumpout 2 at a similar price also represents excellent value for money and certainly offers extra useful features to the Epson Dump ROM – its main drawback being speed and the lack of a Mode 7 dump.

Which one would I buy? Well, I would need both to cover all the modes and printout options.

Obviously the ideal facility would be a compromise. One with the versatility of Dumpout 2 with the added speed and Mode 7 dump of Epson Dump – plus a Mode 7 multitone dump – would be an all out winner.

However, just one more request. For the non-technical or non-programmer there may be a major drawback to both of these utilities.

Unfortunately some knowledge of where to put the single command of Epson Dump or the few commands of Dumpout 2 is required in order to produce a tidy screendump.

In some long complex Basic programs, well protected commercial packages or in machine code routines, this may well be beyond many would-be users.

It would therefore be of immense value if such a useful facility was operable from outside a program, perhaps after initial set up by a single key press which interrupted the program and dumped the screen to the printer.

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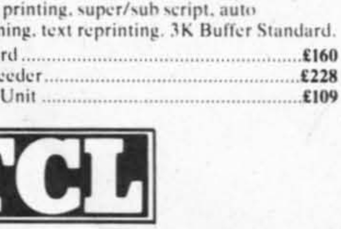

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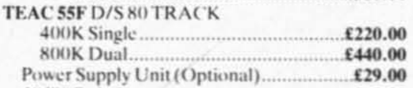

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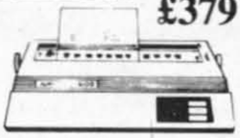

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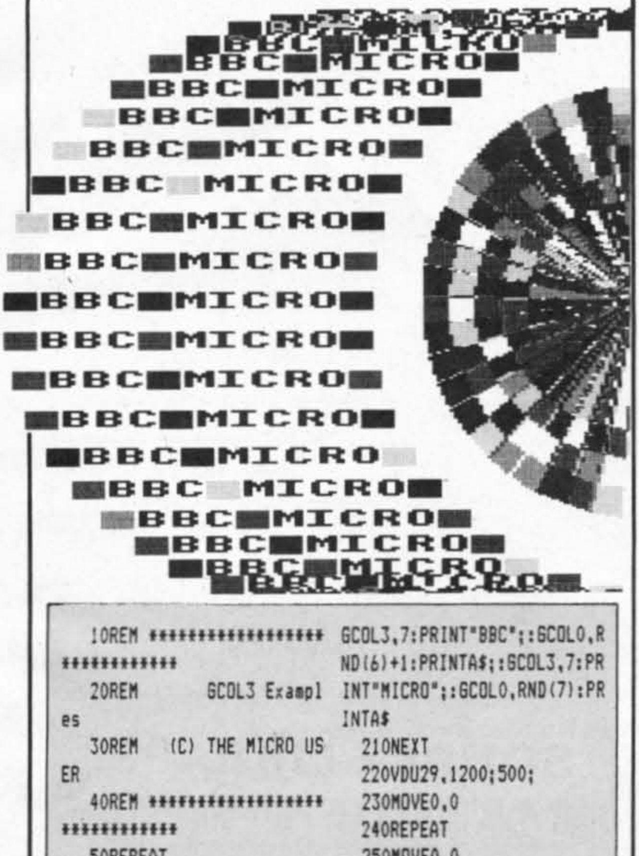

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   10REM *********************
**************
   20REM        GCOL3 Exampl
es
   30REM   (C) THE MICRO US
ER
   40REM *********************
**************
   50REPEAT
   60MODE2
   70VDU23;8202;0;0;0;
   80PROCBBC
   90UNTIL0
  100DEFPROCBBC
  110CLS
  120T=8:R=400:R1=370
  130VDU23,200,255,255,255,
255,255,255,255,255
  140A$=CHR$(200)
  150VDU29,600;500;
  160VDU5
  170FORX=90 TO 270 STEP8
  180X1=RAD(X)
  190MOVE600*COS(X1),500*SI
N(X1)
  200GCOL0,RND(7):PRINTA$;:
GCOL3,7:PRINT"BBC";:GCOL0,R
ND(6)+1:PRINTA$;:GCOL3,7:PR
INT"MICRO";:GCOL0,RND(7):PR
INTA$
  210NEXT
  220VDU29,1200;500;
  230MOVE0,0
  240REPEAT
  250MOVE0,0
  260FORX=90 TO 270 STEPT:X
1=RAD(X)
  270GCOL3,RND(7)
  280PLOT85,R*COS(X1),R1*SI
N(X1)
  290MOVE0,0
  300NEXT
  310R=R-50:R1=R1-50
  320UNTILR1<50
  330D=INKEY(500)
  340VDU4
  350ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

MICROWEB 061-456 4157

... that's the number you'll need for Microweb, the most exciting bulletin board around for the BBC Micro.

On Microweb you can browse through the hundreds of fascinating messages left by other users, and add your own contributions – you'll be amazed by the number of interesting people you'll come across on the board.

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Commstar will turn your micro into a versatile terminal that will allow you to access micros, mainframes, viewdata systems and bulletin boards – including Microweb and Prestel.

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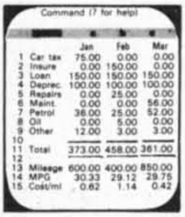

```
          Command (? for help)

              Jan     Feb     Mar
 1 Car tax   75.00    0.00    0.00
 2 Insure     0.00  150.00    0.00
 3 Loan     150.00  150.00  150.00
 4 Deprec.  100.00  100.00  100.00
 5 Repairs    0.00   25.00    0.00
 6 Maint.     0.00    0.00   56.00
 7 Petrol    36.00   25.00   52.00
 8 Oil        0.00    5.00    0.00
 9 Other     12.00    3.00    3.00
10
11 Total    373.00  458.00  361.00
12
13 Mileage  600.00  400.00  850.00
14 MPG       30.33   29.12   29.75
15 Cost/ml    0.62    1.14    0.42
```

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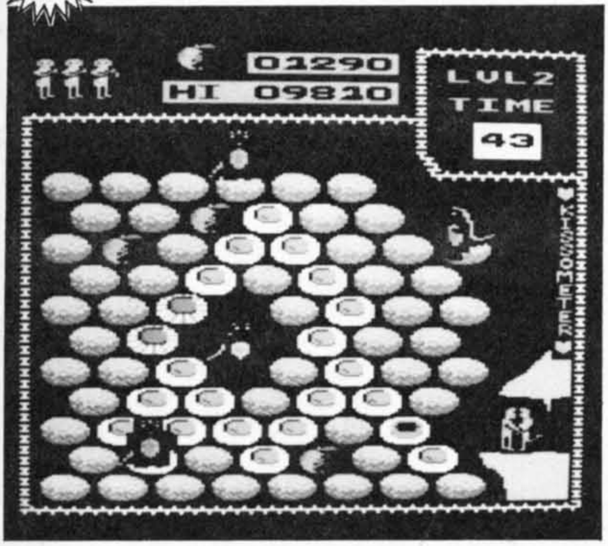

SCREEN PHOTOGRAPH

OG is in a calamity. His territory has been taken over by dinosaurs that lay eggs at a really hectic rate. Og must crush the brood before they hatch by jumping on to each and every egg. Og's problems are compounded by a pack of slavering dinosaurs hungry for his blood – and on higher levels by grand old Ma dinosaur herself. Og can use his magic staff to set a trap, but time is precious as Og knows all too well. Big bonuses can be scored for jumping on fruit, and an even bigger bonus for snatching a kiss from his waiting cavewife.

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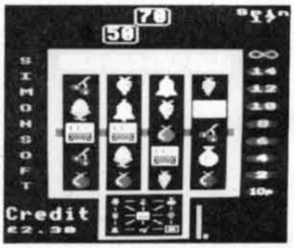

SCREEN PHOTOGRAPH

Features full colour hi-res. graphics, great sound effects, spinning reels, 5 × 4 display of fruit, "bounce" as each reel settles, nudge box, nudge gambles, two-way nudges, swap reels, hold reels, collect win, gamble any win, "loser's gamble" if first gamble is lost, Supergamble for the jackpot and a coin pile that shrinks and grows with your winnings. Separate instruction program. This implementation is in a class of its own.

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Occult forces are threatening the lives of those near and dear to you. Their only salvation rests in your hands but in accepting the challenge your own existence is put in severe peril.

In taking up the challenge you have to find the TALISMAN and locate a pentagram which then has to be prepared for the final rite. In the mean time dark forces will be opposing you making a difficult task almost impossible.

Do not allow yourself to the lulled into a sense of security for it will be short lived.

Many have gone before only to swell the ranks of the damned.

This is the latest adventure from the stables of Microtest and has been written with the acclaimed features of other adventures in mind eg save facility, quick response, simple but extensive commands, a mixture of logical and fiendish problems to solve.

Be warned this is an easy adventure to get into but devilishly difficult to end.

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*DISC 40 or 80 tk **£9.45** inc VAT (add 50p p&p)*

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Typing '*HELP FONTS' gives a list of available fonts and the blocks of characters which they replace.

Available fonts are:

***Accents**	Accents and miscellaneous.
***Block**	Small capitals.
***Data**	Like the bottoms of cheques.
***Greek**	It's all Greek to me too!
***Joined**	Standard capitals with joined up lower case.
***Maths**	A mix of until now unobtainable Mathematical symbols.
***Miscellaneous**	A few oddities which often are very necessary.
***Thick**	Thick text (for MODEs 0&3) to enhance 80 column mode.
***Thin**	Thin text (for MODEs 2&5) which makes modes 2 & 5 much more readable or perhaps "READABLE".
***Vertical**	For labelling graphs.

The ROM has a dump facility which will produce a screen dump of any MODE from 0 to 6 on an Epson, Star printer, CTI CP80 or MT80.

The ROM uses absolutely NO user memory and can be used with word processors etc. as well as normal BASIC programs.

***£17.50** inc VAT (add 50p p&p)*

Microtest Starstick ROM & Joystick Package

Now available the Starstick ROM and Joystick. This comes in three forms:

(A) The Starstick ROM and Quickshot I Joystick
Price 17.95 + VAT = 19.84
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This enables you to plug the Rapid action self centring joysticks until now only available for the Spectrum/Atari/CBM machines into the user port of the BBC. Model A users please note NO ANALOGUE INTERFACE REQUIRED.

Disc Users Note – pressing BREAK, SHIFT-BREAK or CONTROL BREAK does not modify or destroy the STARSTICK software so Disc Users please feel free to Boot!

The software patch provided in the ROM is interrupt driven and adds the following commands to your computer.

- ★ STICK turn on the STARSTICK ROM
- ★ NSTICK turn off the STARSTICK ROM
- ★ SETSTICK set up joystick to users spec
- ★ SAVE "NAME" 140 160 saves your user-key protocols
- ★ ADVAL emulate standard analogue joysticks
- ★ PAUSE define key to Freeze game
- ★ NPAUSE turn off ability to freeze game
- ★ "NAME" predefined key protocols set up for software houses programs
- ★ HELP KEYS displays currently selected key protocols
- ★ REPEAT enables auto-repeat fire
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Large picture shows BBC Computer System and a Quickshot II Joystick. Small inset just a few of the joysticks that will work with the patch lead. Screenshot by kind permission of SUPERIOR SOFTWARE

4

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TCL

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Gridman listing

From Page 69

The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

```
 10 MODE 2
    :PROCINSTRUCT
 20 REM GRIDMAN
 30 REM BY RUSSELL BASSETT AGED
     12.25
 40 REM (C) MICRO USER 1984
 50 MODE 2
    :VDU 23;8202;0;0;0;
 60 VDU 23,230,124,124-40,124,0
    ,0,0,0,198
 70 VDU 23,231,0,0,0,16,254,124
    ,124,0
 80 MAN$=CHR$ (18)+CHR$ (0)+
    CHR$ (3)+CHR$ (230)+CHR$ (8)+
    CHR$ (18)+CHR$ (0)+CHR$ (1)+
    CHR$ (231)+CHR$ (8)
 90 VDU 23,232,126,255,255-36,255-36
    ,255,255-24,255,126
100 MON$=CHR$ (18)+CHR$ (3)+
    CHR$ (3)+CHR$ (232)
110 ENVELOPE 1,3,0,0,0,0,0,0,121
    ,-10,-5,-2,120,120
120 INPUT "   SKILL",SKILL
    :IF SKILL<2 OR SKILL>16
    THEN VDU 7
    :GOTO 120
130 CLS
140 VDU 5
    :SCORE=0
    :SHEETS=1
150 X=100
    :Y=80
160 MX=100
    :MY=640
170 PROCGRID
    :PROCSCORE
180 PROCPMAN(X,Y)
    :PROCPMON(MX,MY)
190 FILLED=0
200 PROCMAN
210 IF RND(SKILL)=1
    THEN PROCMON
220 IF MX=X AND MY=Y
    THEN PROCDEAD
    :GOTO 20
230 IF FILLED=80
    THEN PROCSHEET
    :GOTO 150
240 GOTO 200
250 END
260 DEF PROCGRID
270 GCOL 0,3
280 FOR Y%=0 TO 640 STEP 80
290 MOVE 100,Y%
    :DRAW 1100,Y%
300 NEXT
310 FOR X%=100 TO 1100 STEP 100
320 MOVE X%,0
    :DRAW X%,640
330 NEXT
340 ENDPROC
350 DEF PROCPMAN(X%,Y%)
360 MOVE X%+28,Y%-24
370 PRINT MAN$
380 ENDPROC
390 DEF PROCPMON(X%,Y%)
400 MOVE X%+23,Y%-24
410 PRINT MON$
420 ENDPROC
430 DEF PROCMAN
440 XX=X
    :YY=Y
450 IF INKEY (-98)
    THEN XX=XX-100
460 IF INKEY (-67)
    THEN XX=XX+100
470 IF INKEY (-105)
    THEN YY=YY-80
480 IF INKEY (-73)
    THEN YY=YY+80
490 IF XX<100 OR XX>1090
    THEN XX=X
500 IF YY<80 OR YY>640
    THEN YY=Y
510 IF XX=X AND YY=Y
    THEN ENDPROC
520 IF POINT(X+10,Y-10)=4
    THEN PROCFILL(X,Y)
    :X=XX
    :Y=YY
    :PROCPMAN(X,Y)
    :ENDPROC
530 SOUND 1,1,200,1
540 PROCFILL(X,Y)
    :PROCPMAN(XX,YY)
550 X=XX
    :Y=YY
560 SCORE=SCORE+10
    :PROCSCORE
    :FILLED=FILLED+1
570 ENDPROC
580 DEF PROCFILL(X%,Y%)
590 GCOL 0,4
600 MOVE X,Y
610 DRAW X+100,Y
620 PLOT 85,X+100,Y-80
630 PLOT 85,X,Y-80
640 PLOT 85,X,Y
650 ENDPROC
660 DEF PROCSCORE
670 VDU 4
680 COLOUR 7
690 PRINT TAB(2,1);"Score=";SCORE
700 PRINT TAB(2,2);"Sheets=";SHEETS
710 VDU 5
720 ENDPROC
730 DEF PROCMON
740 XX=MX
    :YY=MY
    :DI=RND(4)
750 IF X<XX AND RND(3)=1
    THEN DI=1
760 IF X>XX AND RND(3)=1
    THEN DI=2
770 IF Y<YY AND RND(3)=1
    THEN DI=3
780 IF Y>YY AND RND(3)=1
    THEN DI=4
790 IF DI=1
    THEN XX=XX-100
800 IF DI=2
    THEN XX=XX+100
810 IF DI=3
    THEN YY=YY-80
820 IF DI=4
    THEN YY=YY+80
830 IF XX<100 OR XX>1030
    THEN XX=MX
840 IF YY<0 OR YY>640
    THEN YY=MY
850 IF XX=MX AND YY=MY
    THEN ENDPROC
860 PROCPMON(MX,MY)
870 PROCPMON(XX,YY)
880 MX=XX
    :MY=YY
890 ENDPROC
900 DEF PROCDEAD
910 FOR I%=250 TO 0 STEP -5
920 SOUND 1,0,I%,1
    :SOUND 0,-15,3,1
930 NEXT
940 *FX21,0
950 VDU 22,7
960 PRINT
    :PRINT
    :PRINT
    :PRINT
    :PRINT CHR$ (141);"YOU'RE DEAD!!
    !"
    :PRINT CHR$ (141);"YOU'RE DEAD!!
    !"
970 PRINT
    :PRINT
```

→

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Gridman listing

From Page 146

```
     :PRINT "YOU SCORED ";SCORE
 980 PRINT
     :PRINT
     :PRINT
     :PRINT
     :PRINT "PRESS SPACE FOR ANOTHER
      GO"
 990 REPEAT UNTIL GET =32
1000 ENDPROC
1010 DEF PROCSHEET
1020 FOR I%=100 TO 250 STEP 5
1030 SOUND 1,0,I%,1
     :SOUND 0,-15,7,1
1040 NEXT
1050 IF SKILL>2
     THEN SKILL=SKILL-1
1060 FILLED=0
     :SHEETS=SHEETS+1
     :CLS
1070 ENDPROC
1080 DEF PROCINSTRUCT
1090 CLS
1100 NAME$="R.BASSETT"
1110 COLOUR 12
     :PRINT ''"       GRIDMAN"
1120 COLOUR 1
     :PRINT ''"            By"
1130 VDU 5
1140 GCOL 0,3
     :MOVE 340,760
     :PRINT NAME$
1150 GCOL 0,1
     :MOVE 344,756
     :PRINT NAME$
1160 VDU 4,20,10,10
1170 COLOUR 135
     :COLOUR 0
     :PRINT
     :PRINT
     :PRINT
     :PRINT
     :PRINT
     :PRINT "PRESS"
1180 PRINT
     :PRINT
     :PRINT
     :VDU 20
1190 PRINT "SPACE TO PLAY"
1200 PRINT
1210 PRINT "RETURN FOR INFO"
1220 K%=GET
     :IF K%<>32 AND K%<>13
     THEN 1220
1230 IF K%=32
     THEN ENDPROC
1240 IF K%=13
     THEN GOTO 1250
```

```
1250 VDU 22,7
     :PRINT
1260 PRINT CHR$ (131)"   INSTRUCTIONS
     "
1270 PRINT
     :COLOUR 7
1280 PRINT "The object of the game
      is to guide your man, Sid,
      ";
1290 PRINT "around the grid filling
      in thesquares to gain points
      whilst avoiding  Dyllon, ";
1300 PRINT "the grid monster.  You
      score 10 points for each square
      filled."
1310 PRINT "When you have filled
      in all 80 squares  you are
      transported to another grid
          where Dyllon is even more
      intelligent."
1320 PRINT "At the start of each
      game you are asked for a skill
      level. This can be a number
      between 2 and 16, 2 being the
      hardest.  The skill level contr
     ols the initial  intelligence
      of Dyllon."
1330 PRINT
     :PRINT CHR$ (129);CHR$ (157);
     CHR$ (131)" PRESS SPACE  ";
     CHR$ (156)
     :REPEAT UNTIL GET =32
     :CLS
     :PRINT
1340 PRINT CHR$ (130)"The controls
      are as follows."
1350 PRINT
1360 PRINT CHR$ (129)"   Z:LEFT"
1370 PRINT
1380 PRINT CHR$ (131)"   X:RIGHT"
1390 PRINT
1400 PRINT CHR$ (133)"   *:UP"
1410 PRINT
1420 PRINT CHR$ (134)"   ?:DOWN"

1430 VDU 20,10,10
1440 PRINT "Very occasionally Dyllon
      becomes        invisible to
      make the game harder."
     :PRINT
     :PRINT
     :PRINT
1450 PRINT
     :PRINT
     :PRINT
     :PRINT CHR$ (129)CHR$ (157);
     CHR$ (131)" PRESS SPACE TO PLAY
      ";CHR$ (156)
     :REPEAT UNTIL GET =32
     :CLS
     :ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

M-TEC

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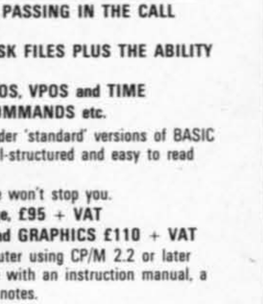

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Difference Square listing

From Page 71

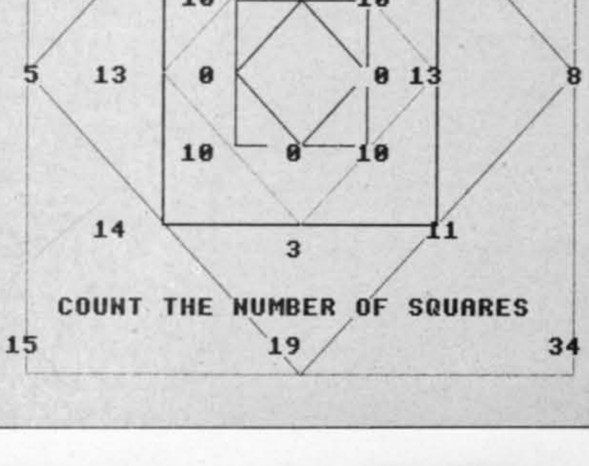
The listings in this article are produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of *The Micro User*.

```
 10 REM DIFFERENCE SQUARE
 20 REM By John Scott '84
 30 REM Inspired by Frank Gregory
 40 REM In prehistoric Basic
 50 *TV255
 60 MODE 7
 70 PRINT TAB(10,9);CHR$ (141);
    CHR$ (136);"DIFFERENCE SQUARE"

 80 PRINT TAB(10,10);CHR$ (141);
    CHR$ (136);"DIFFERENCE SQUARE"

 90 PRINT TAB(10,12)CHR$ (134)"
     By John Scott"
100 PRINT TAB(4,15)CHR$ (134);
    CHR$ (141);"HOW MANY SQUARES
     CAN YOU MAKE?"
110 PRINT TAB(4,16)CHR$ (134);
    CHR$ (141)"HOW MANY SQUARES
     CAN YOU MAKE?"
120 PRINT TAB(12,20)CHR$ (131)"DO
     YOU WANT"
130 PRINT TAB(12,22)CHR$ (131)"INSTR
    UCTIONS?"
140 PRINT TAB(12,24)CHR$ (131)"TYPE
     Y OR N"
150 IF GET$ ="N"
    THEN 720
160 MODE 1
170 PRINT TAB(10,5)"DIFFERENCE SQUAR
    E"
180 PRINT TAB(10,18)" 1.DRAW A SQUAR
    E"
190 PROConesq
200 PRINT TAB(10,24)"PRESS ANY KEY
     TO CONTINUE"
210 A$=GET$
220 CLS
    : PRINT TAB(10,18)" 2.DRAW A
     SECOND SQUARE"
230 PRINT TAB(12,20)"FROM THE MIDDLE
     POINTS"
240 PRINT TAB(12,22)"OF THE FIRST
     SQUARE"
250 PROConesq
260 PROCtwosq
270 PRINT TAB(10,30)"PRESS ANY KEY
     TO CONTINUE"
280 A$=GET$
290 CLS
    : PRINT TAB(10,18)" 3.PUT A
     NUMBER"
300 PRINT TAB(12,20)"AT EACH CORNER"
310 PRINT TAB(12,22)"OF THE FIRST
     SQUARE"
320 PRINT TAB(12,24)"IN THIS ORDER"
330 PRINT TAB(12,26)"W,X,Y,Z"
340 VDU 4
350 PRINT TAB(5,30)"W"
360 PRINT TAB(38,30)"X"
370 PRINT TAB(38,0)"Y"
380 PRINT TAB(5,0)"Z"
390 PROConesq
    :PROCtwosq
400 PRINT TAB(10,30)"PRESS ANY KEY
     TO CONTINUE"
410 A$=GET$
420 CLS
430 PRINT TAB(10,26)"PRESS ANY KEY
     TO CONTINUE"
440 PROConesq
450 PROCtwosq
460 PROCnum
470 A$=GET$
480 CLS
    :PRINT TAB(10,18)" 4.FIND THE
     DIFFERENCE"
490 PRINT TAB(12,20)"BETWEEN ANY
     TWO CORNERS"
500 PRINT TAB(12,22)"AND PUT THIS
     NUMBER IN"
510 PRINT TAB(12,24)"THE MIDDLE
     OF THE LINE"
520 PRINT TAB(10,28)"PRESS ANY KEY
     TO CONTINUE"
530 PROConesq
540 PROCtwosq
550 PROCnum
560 PROCcalc
570 PROCmid
580 A$=GET$
590 CLS
    :PRINT TAB(10,18)" 5.CONTINUE
     UNTIL YOU"
600 PRINT TAB(12,20)"REACH A SQUARE"
610 PRINT TAB(12,22)"WITH CORNERS
     THAT"
620 PRINT TAB(12,24)"ARE ALL 0 (ZERO
    )"
630 PROConesq
640 PROCtwosq
650 PROCthreesq
660 PROCfoursq
670 PROCnum
680 PROCmid
690 PRINT TAB(8,26)"For an EXAMPLE"
700 PRINT TAB(8,28)"Press any key
     to continue"
710 A$=GET$
720 MODE 1
    : CLS
    :PROConesq
730 PRINT TAB(12,16)"CHECK YOUR
     SQUARE"
```

→



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COUNT THE NUMBER OF SQUARES

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TCL

HOW TO ORDER

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Twillstar Computers Limited

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Difference Square listing

From Page 150

```
 740 PRINT TAB(8,18)"If the four
      corners of the 8th."
 750 PRINT TAB(7,20)"square are NOT
      all 0(zero)"
 760 PRINT TAB(7,22)"then press Y
      and put the numbers"
 770 PRINT TAB(7,24)"ON THE NEW SQUAR
     E."
 780 PRINT TAB(7,26)"Do not count
      the first square"
 790 PRINT TAB(7,28)"on the second
      screen."
 800 PRINT TAB(5,30)"W"
 810 PRINT TAB(38,30)"X"
 820 PRINT TAB(38,0)"Y"
 830 PRINT TAB(5,0)"Z"
 840 *FX11,0
 850 INPUT TAB(4,2)"TYPE IN YOUR
      FIRST NUMBER (W)",W%
 860 INPUT TAB(4)"TYPE IN YOUR SECOND
      NUMBER(X)",X%
 870 INPUT TAB(4)"TYPE IN YOUR THIRD
      NUMBER(Y)",Y%
 880 INPUT TAB(4)"TYPE IN YOUR FOURTH
      NUMBER(Z)",Z%
 890 *FX12,0
 900 MODE 1
 910 @%=&00002
 920 PROConesq
 930 PRINT TAB(5,30)W%
 940 PRINT TAB(36,30)X%
 950 PRINT TAB(36,0)Y%
 960 PRINT TAB(5,0)Z%
 970 IF W%=0 AND X%=0 AND Y%=0
     AND Z%=0
     THEN 1450
 980 PROCtwosq
 990 PROCcalc
1000 PRINT TAB(20,30)A%
1010 PRINT TAB(36,16)B%
1020 PRINT TAB(20,0)C%
1030 PRINT TAB(5,16)D%
1040 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1050 PROCchange
1060 PROCcalc
1070 PRINT TAB(29,24)A%
1080 PROCthreesq
1090 PRINT TAB(29,8)B%
1100 PRINT TAB(10,8)C%
1110 PRINT TAB(10,24)D%
1120 PROCfoursq
1130 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1140 PROCchange
1150 PROCcalc
1160 PRINT TAB(28,16)A%
1170 PRINT TAB(20,7)B%
1180 PRINT TAB(10,16)C%
1190 PRINT TAB(20,25)D%
1200 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1210 PROCfivesq
     :PROCchange
     :PROCcalc
1220 PRINT TAB(25,12)A%
1230 PRINT TAB(15,12)B%
1240 PRINT TAB(15,20)C%
1250 PRINT TAB(25,20)D%
1260 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1270 PROCsixsq
     :PROCchange
     :PROCcalc
1280 PRINT TAB(20,11)A%
1290 PRINT TAB(15,16)B%
1300 PRINT TAB(20,20)C%
1310 PRINT TAB(25,16)D%
1320 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1330 PROCsevensq
     :PROCchange
     :PROCcalc
1340 PRINT TAB(19,14)A%
1350 PRINT TAB(19,18)B%
1360 PRINT TAB(24,18)C%
1370 PRINT TAB(24,14)D%
1380 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1390 PROCeightsq
     :PROCchange
     :PROCcalc
1400 PRINT TAB(19,16)A%
1410 PRINT TAB(21,17)B%
1420 PRINT TAB(23,16)C%
1430 PRINT TAB(21,15)D%
1440 IF A%=0 AND B%=0 AND C%=0
     AND D%=0
     THEN 1450
1450 PRINT TAB(8,28)"COUNT THE NUMBER
      OF SQUARES"
1460 PRINT TAB(8,2)"DO YOU WANT TO
      CHECK ANOTHER"
1470 PRINT TAB(8,4)"SQUARE?--TYPE
      Y OR N"
1480 A$=GET$
1490 IF A$="Y"
     THEN 720
1500 MODE 7
1510 PRINT TAB(10,9);CHR$ (141);
     CHR$ (136);CHR$ (131);"GOODBYE"
1520 PRINT TAB(10,10);CHR$ (141);
     CHR$ (136);CHR$ (131);"GOODBYE"
1530 PRINT TAB(7,19);CHR$ (141);
     CHR$ (136);CHR$ (129);"TRY AGAIN
      SOON"
1540 PRINT TAB(7,20);CHR$ (141);
     CHR$ (136);CHR$ (129);"TRY AGAIN
      SOON"
1550 PRINT TAB(5,25);CHR$ (134);
     "TYPE  RUN  IF SOMEONE ELSE
      WANTS A GO!"
1560 REM PENULT
1570 END
1580 DEF PROConesq
1590 GCOL 0,1
1600 MOVE 200,0
1610 DRAW 1200,0
1620 DRAW 1200,1000
1630 DRAW 200,1000
1640 DRAW 200,0
1650 ENDPROC
1660 DEF PROCtwosq
1670 GCOL 0,2
1680 MOVE 700,0
1690 DRAW 1200,500
1700 DRAW 700,1000
1710 DRAW 200,500
1720 DRAW 700,0
1730 ENDPROC
1740 DEF PROCthreesq
1750 GCOL 0,3
1760 MOVE 450,250
1770 DRAW 950,250
1780 DRAW 950,750
1790 DRAW 450,750
1800 DRAW 450,250
1810 ENDPROC
1820 DEF PROCfoursq
1830 GCOL 0,1
1840 MOVE 450,500
1850 DRAW 700,250
1860 DRAW 950,500
1870 DRAW 700,750
1880 DRAW 450,500
1890 ENDPROC
1900 DEF PROCfivesq
1910 GCOL 0,2
1920 MOVE 580,380
1930 DRAW 820,380
1940 DRAW 820,620
1950 DRAW 580,620
1960 DRAW 580,380
1970 ENDPROC
1980 DEF PROCsixsq
1990 GCOL 0,3
2000 MOVE 700,380
2010 DRAW 820,500
```

```
2020 DRAW 700,620
2030 DRAW 580,500
2040 DRAW 700,380
2050 ENDPROC
2060 DEF PROCsevensq
2070 GCOL 0,1
2080 MOVE 640,440
2090 DRAW 760,440
2100 DRAW 760,560
2110 DRAW 640,560
2120 DRAW 640,440
2130 ENDPROC
2140 DEF PROCeightsq
2150 GCOL 0,2
2160 MOVE 700,440
2170 DRAW 760,500
2180 DRAW 700,560
2190 DRAW 640,500
2200 DRAW 700,440
2210 ENDPROC
2220 DEF PROCnum
2230 @%=&00002
2240 W%=RND(100)
2250 X%=RND(100)
2260 Y%=RND(100)
2270 Z%=RND(100)
2280 PRINT TAB(4,30)W%
2290 PRINT TAB(36,30)X%
2300 PRINT TAB(36,0)Y%
2310 PRINT TAB(5,0)Z%
2320 ENDPROC
2330 DEF PROCmid
2340 IF W%>X%
     THEN A%=(W%-X%)
     ELSE A%=(X%-W%)
2350 IF X%>Y%
     THEN B%=(X%-Y%)
     ELSE B%=(Y%-X%)
2360 IF Y%>Z%
     THEN C%=(Y%-Z%)
     ELSE C%=(Z%-Y%)
2370 IF Z%>W%
     THEN D%=(Z%-W%)
     ELSE D%=(W%-Z%)
2380 PRINT TAB(20,30)A%
2390 PRINT TAB(36,16)B%
2400 PRINT TAB(20,0)C%
2410 PRINT TAB(5,16)D%
2420 ENDPROC
2430 DEF PROCcalc
2440 IF W%>X%
     THEN A%=(W%-X%)
     ELSE A%=(X%-W%)
2450 IF X%>Y%
     THEN B%=(X%-Y%)
     ELSE B%=(Y%-X%)
2460 IF Y%>Z%
     THEN C%=(Y%-Z%)
     ELSE C%=(Z%-Y%)
2470 IF Z%>W%
     THEN D%=(Z%-W%)
     ELSE D%=(W%-Z%)
2480 ENDPROC
2490 DEF PROCchange
2500 W%=A%
2510 X%=B%
2520 Y%=C%
2530 Z%=D%
2540 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

BBC Model B
(any OS, Basic I/II)

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£9.95 Tape, £12.95 Disc
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Teditor listing

From Page 63

This listing was produced using a special formatter which breaks one program line over several lines of listing. When entering a line don't press Return until you come to the next line number. Full details of the formatter are in the July 1983 issue of The Micro User.

```
 10 REM Teletext Screen Editor
 20 REM Jim Notman Jan 1984
 30 ON ERROR GOTO 170
 40 MODE 7
 50 PRINT TAB(2,6)"Initialising....";
 60 PROCinit
 70 VDU 12
    :PROCmove
 80 PROChelp
 90 REPEAT
100 PROCread
    :a=GET
110 IF a=9
    THEN VDU 7
    :a=&80+GET
    :IF a>255
    THEN a=32
120 IF a=13 OR a=127
    THEN PROCcursor
    :GOTO 160
130 IF a<32
    THEN a=32
140 IF a>=142 AND a<=144 OR a=155
    THEN PROCcursor
    :GOTO 160
150 PROCwrite
160 UNTIL FALSE
170 IF ERR =17
    THEN PROCcmd
    ELSE IF ERR <>0
    THEN PROCerror
180 GOTO 90
190
200 DEF PROCinit
210 max=5
220 trans=FALSE
230 DIM screen1 960,screen2 960
    ,screen3 960,screen4 960,screen5
     960
240 DIM cmd 30,ptr(max)
250 ptr(1)=screen1
260 ptr(2)=screen2
270 ptr(3)=screen3
280 ptr(4)=screen4
290 ptr(5)=screen5
300 Z%=&20202020
310 FOR I%=0TO 956STEP 4
    :I%!screen1=Z%
    :I%!screen2=Z%
    :I%!screen3=Z%
    :I%!screen4=Z%
    :I%!screen5=Z%
    :NEXT
320 *FX225,1
330 *FX226,128
340 *FX227,140
350 *FX228,150
360 *FX4,2
370 *KEY12 |!|N
380 *KEY13 |!|O
390 *KEY14 |!|P
400 *KEY15 |!|[
410 X=0
    :Y=0
    :screen=1
420 VDU 23,0,10,96,0;0;0;
430 VDU 23,1,0;0;0;0;
440 ENDPROC
450
460 DEF PROCsystem
470 A%=0
    :Y%=0
    :S%=USR (&FFDA) AND &F
480 ENDPROC
490
500 DEF PROCcursor
510 IF a=142
    THEN X=X-1
    :IF X<0
    THEN X=39
520 IF a=143
    THEN X=X+1
    :IF X>39
    THEN X=0
530 IF a=144
    THEN Y=Y+1
    :IF Y>23
    THEN Y=0
540 IF a=155
    THEN Y=Y-1
    :IF Y<0
    THEN Y=23
550 IF a=13
    THEN X=0
    :Y=Y+1
    :IF Y>23
    THEN Y=0
560 IF a=127
    THEN IF X>=1
    THEN VDU 127
    :X=X-1
570 ENDPROC
580
590 DEF PROCclear
    :VDU 26
600 PRINT TAB(0,24)STRING$(39,"
     ");
    :VDU 31,0,24
    :ENDPROC
610
620 DEF PROCread
630 VDU 23,1,0;0;0;0;31,X,Y
640 A%=135
650 char=(USR (&FFF4)AND &FFFF)
     DIV 256
660 PROCclear
670 PRINT TAB(0,24)"X=";X;TAB(5
    ,24)"Y=";Y;TAB(10,24);
680 IF char>127AND char<160
    THEN PROCcode
    ELSE PROCchar
690 PRINT TAB(30,24)"Screen ";screen;
700 VDU 31,X,Y,23,1,1;0;0;0;
710 ENDPROC
720
730 DEF PROCchar
740 PRINT "Char (";char;")=";
    :IF char=32
    THEN PRINT "Space";
    :
    ELSE VDU char
750 ENDPROC
760
770 DEF PROCwrite
780 VDU a
    :IF M=2
    THEN X=X+1
    :IF X>39
    THEN X=0
    :Y=Y+1
    :IF Y>23
    THEN Y=0
790 IF M=3
    THEN Y=Y+1
    :IF Y>23
    THEN Y=0
800 ENDPROC
810
820 DEF PROCcode
830 RESTORE
840 REPEAT
850 READ c,c$
    :UNTIL c=char OR c$="*"
860 IF c$="*"
    THEN PRINT ;"Char ="char;" ?";
    ELSE PRINT c$;
870 ENDPROC
880
```

SYSTEMS

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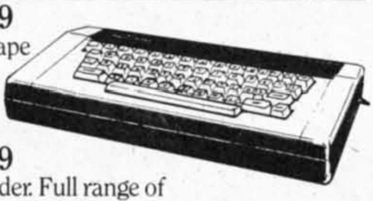

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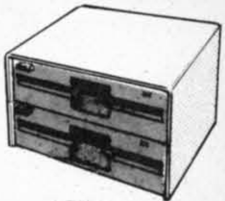

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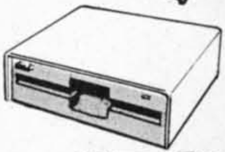

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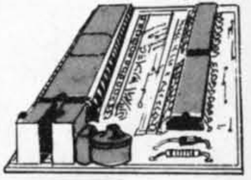

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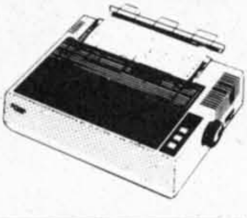
PRINTERS



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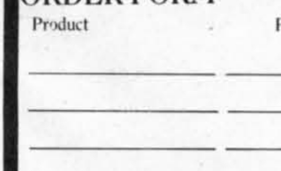
DISKETTES



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I enclose my order for the above products.

Name

Address

Signed

Teditor listing

From Page 154

```
890 DEF PROCcmd
900 VDU 23,1,0;0;0;0;
910 PROCclear
920 PRINT "Command (L,S,C,I,D,W,B,E,
    M,?)";
930 G%=INSTR("EeSsLl?/BbCcWwIiDdMm"
    ,GET$ )
    :G%=(G%+1)DIV 2
940 PROCclear
950 ON G%GOTO 1080 ,960 ,970 ,980
    ,990 ,1000 ,1010 ,1020 ,1030
    ,1040
    ELSE 920
960 a$="SAVE "
    :address$=" 7C00 +3C0"
    :PROCfile
    :GOTO 1050
970 a$="LOAD "
    :address$=" 7C00"
    :PROCfile
    :GOTO 1050
980 PROChelp
    :GOTO 1050
990 PROCclear
    :g=GET
    :GOTO 1050
1000 PROCchange
    :GOTO 1050
1010 PROCwipe
    :GOTO 1050
1020 PROCinsert
    :GOTO 1050
1030 PROCdelete
    :GOTO 1050
1040 PROCmove
    :GOTO 1050
1050 VDU 26,23,1,1;0;0;0;
1060 ENDPROC
1070
1080 PROCsure("END PROGRAM")
    :IF g=78
    THEN 1050
1090 VDU 26,12,23,1,1;0;0;0;
    :*FX4
1100 END
1110
1120 DEF PROCinsert
1130 PROCsure("Insert line")
1140 IF g=78
    THEN 1200
1150 IF Y=23
    THEN 1200
1160 FOR I%=22 TO Y STEP -1
    :FOR J%=0 TO 36 STEP 4
1170 !((I%+1)*40+J%+&7C00)=!(I%*40+J%
    +&7C00)
1180 NEXT
    :NEXT
1190 FOR J%=0 TO 39
    :?(Y*40+J%+&7C00)=32
    :NEXT
1200 ENDPROC
1210
1220 DEF PROCdelete
1230 PROCsure("Delete line "+
    STR$ (Y))
1240 IF g=78
    THEN 1290
1250 FOR I%=Y TO 22
    :FOR J%=0 TO 36 STEP 4
1260 !(I%*40+J%+&7C00)=!((I%+1)*40+J%
    +&7C00)
1270 NEXT
    :NEXT
1280 FOR J%=0 TO 39
    :J%?&7F98=32
    :NEXT
1290 ENDPROC
1300
1310 DEF PROCfile
1320 VDU 28,0,24,39,24
1330 PROCsystem
1340 PRINT a$;
    :INPUT "Filename ",file$
    :D$=""
1350 IF S%=4
    THEN REPEAT
    :INPUT "Drive ",D%
    :UNTIL D%>=0 AND D%<=3
    :D$=":"+STR$ (D%)+"."
1360 $cmd=a$+D$+file$+address$
1370 X%=cmd MOD 256
    :Y%=cmd DIV 256
    :CALL &FFF7
1380 VDU 26
1390 ENDPROC
1400
1410 DEF PROCchange
1420 PROCtomem(screen)
1430 PROCclear
    :PRINT "Current screen ";screen;
    " : New screen (1]5)";
1440 REPEAT
    :n=GET -48
    :UNTIL n>0 AND n<max+1
1450 IF n=screen
    THEN 1480
1460 PROCfromem(n)
1470 screen=n
1480 ENDPROC
1490
1500 DEF PROCsure(m$)
1510 PRINT m$;" : Are you sure (Y/N)?
    ";
1520 g=GET AND &DF
    :IF g<>89 AND g<>78
    THEN 1520
1530 ENDPROC
1540
1550 DEF PROCwipe
1560 PROCsure("WIPE screen "+
    STR$ (screen))
1570 IF g=78
    THEN 1600
1580 FOR I%=0 TO 956 STEP 4
    :I%!&7C00=&20202020
    :NEXT
1590 PROCtomem(screen)
1600 ENDPROC
1610
1620 DEF PROChelp
1630 IF trans=FALSE
    THEN PROCtomem(screen)
    :trans=TRUE
1640 VDU 26,12
1650 FOR I%=0TO 1
    :PRINT TAB(9,2+I%)"<134><157>
    <132><141>Teletext Editor
    <156>"
    :NEXT
1660 PRINT TAB(1,5)"<131>To enter
     a Command, Press ESCAPE"
1670 PRINT TAB(3,6)"<131>then the
     command letter"
1680 VDU 28,8,24,39,8
1690 PRINT "S..Save screen"'"L..Load
     screen"
1700 PRINT "B..Blank bottom line"'
    "C..Change current screen"
1710 PRINT "I..Insert line"'"D..Delet
    e line"
1720 PRINT "W..Wipe current screen"'
    "M..Movement of cursor"
1730 PRINT "?..Help page"'"E..End
     program"
1740 PRINT ''"Press a key to continue
    ";
    :g=GET
1750 PROCfromem(screen)
    :trans=FALSE
1760 ENDPROC
1770
1780 DEF PROCmove
1790 IF trans=FALSE
    THEN PROCtomem(screen)
    :trans=TRUE
1800 VDU 12,28,4,24,39,8
1810 PRINT "After printing a characte
```

```
     r do you"'"want the cursor to"
1820 PRINT '"1..Stay in the same
      place"
1830 PRINT "2..To move to the right"
1840 PRINT "3..Move downwards"
1850 VDU 26
1860 PRINT TAB(4,18)"<134>Which way?
      (1,2,3)"
1870 REPEAT
     :M=GET -48
     :UNTIL M>0 AND M<4
1880 PROCfromem(screen)
     :trans=FALSE
1890 ENDPROC
1900
1910 DEF PROCtomem(mem)
1920 P%=ptr(mem)
1930 FOR I%=0 TO 956 STEP 4
     :P%!I%=I%!&7C00
     :NEXT
1940 ENDPROC
1950
1960 DEF PROCfromem(mem)
1970 P%=ptr(mem)
1980 FOR I%=0 TO 956 STEP 4
     :I%!&7C00=P%!I%
     :NEXT
1990 ENDPROC
2000
2010 DEF PROCerror
2020 VDU 26,31,0,23,7
     :REPORT
2030 PRINT " at line";ERL ;
2040 G=INKEY (750)
2050 VDU 23,1,1;0;0;0;7
2060 ENDPROC
2070
2080 DATA 129,Alpha RED,130,Alpha
      GREEN
2090 DATA 131,Alpha YELLOW,132,Alpha
      BLUE
2100 DATA 133,Alpha MAGENTA,134
     ,Alpha CYAN
2110 DATA 135,Alpha WHITE
2120 DATA 136,Flash ON,137,Flash
      OFF
2130 DATA 140,Normal Height,141
     ,Double Height
2140 DATA 145,Graphics RED,146,Graphi
     cs GREEN
2150 DATA 147,Graphics YELLOW,148
     ,Graphics BLUE
2160 DATA 149,Graphics MAGENTA,150
     ,Graphics CYAN
2170 DATA 151,Graphic WHITE,152
     ,Conceal Display
2180 DATA 153,Contiguous Graphics
     ,154,Separate Graphics
2190 DATA 156,Black Background,157
     ,New Background
2200 DATA 158,Hold Graphics,159
     ,Release Graphics,160,*
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

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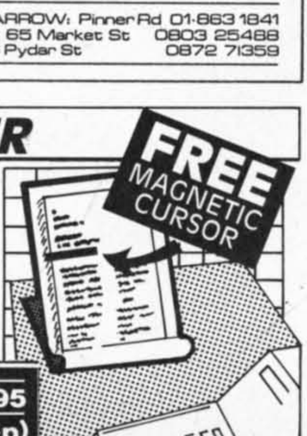

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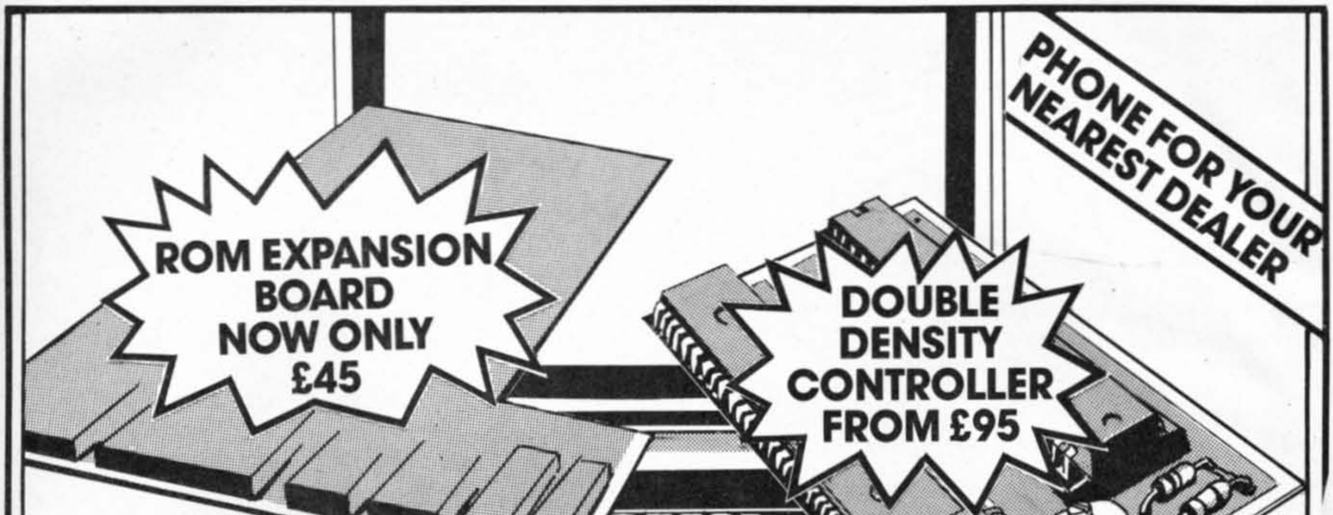
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Castle of Fear listing

From Page 99

```
390 PROCplayer
400 UNTIL 0
410 DEF PROCplayer
420 W%=0
430 IF RND(100-T%)<10 PRINT '"A
     small dwarf walks up to you.
     says"'"'Hurry up', and then
     walks off."
440 IF RND(100)<10 PRINT 'CHR$ 134
    "Listen, you can hear strange
     voices."
450 IF C%>0 AND RND(100)<8PRINT
    "A sprite takes the ";coin$(C%);
    " coin"'"and runs away."
    :C%=C%-1
    :REPEAT
    :R%=RND(27)
    :UNTIL R%<>14 AND cts%(R%)=0
    :cts%(R%)=1
460 IF (coin%(1)<>0 AND coin%(2)<>0
     AND coin%(3)<>0) AND NOT (Y%
     EOR 0)
    THEN IF ABS (coin%(3)-coin%(2))=
    ABS (coin%(2)-coin%(1))
    PROCmsg(7)
    :END
470 PRINT 'CHR$ 130"Turns"CHR$ 135;
    "-";CHR$ 131;T%
    :IF T%>=100PRINT '"'Sorry time
     up' says a ghostly voice."'
    :PROCmsg(RND(4))
480 *FX15,1
490 G$=""
    :PRINT '"Your move";CHR$ 131;
    :G$=INKEY$ (1800)
    :IF G$="" G$="w"
    :PRINT "wait"
    ELSE PRINT G$'
500 RESTORE 2710
510 REPEAT
520 READ des$,N%
530 UNTIL des$=G$ OR N%=255
540 IF N%=255PRINT CHR$ 133"huh
     ?"
    :ENDPROC
550 T%=T%+1
560 IF N%<=6 PROCmove
    :ENDPROC
570 IF N%=7 PROCenter(room%)
    :T%=T%-1
    :ENDPROC
580 IF N%=8 PROCget
    :ENDPROC
590 IF N%=9 PROCdrop
    :ENDPROC
600 IF N%=10 PROCinv
    :ENDPROC
610 IF N%=11 PROCquit
    :ENDPROC
620 IF N%=12 PROCwait
    :ENDPROC
630 IF N%=13 PROCatta
    :ENDPROC
640 IF N%=14 PROChelp
    :ENDPROC
650 ENDPROC
660 DEF PROChelp
670 RESTORE 2810
680 REPEAT READ S%,des$
690 UNTIL S%>=T% OR S%=95
700 PRINT CHR$ 131;des$
710 ENDPROC
720 DEF PROCwait
730 PRINT 'CHR$ 134"You wait."'
    CHR$ 134"Time passes ";
    :FOR N=1 TO 10
    :PRINT ;".";
    :TIME =0
    :REPEAT UNTIL TIME >20
    :NEXT
    :PRINT
740 DEF PROCmvtr
750 tr%=troll%(1)
    :W%=1
760 PROCmv
    :PROCtroll
770 IF troll%(1)=room% AND tr%<>room
    % PRINT 'CHR$ 130"A large troll
     enters, holding";
    :IF troll%(2)=0 PRINT ;" nothing
    ."
780 IF troll%(1)=room% AND tr%<>room
    % AND troll%(2)<>0 PRINT
    CHR$ (130)"a"'CHR$ 130"glitterin
    g jewel."
790 IF troll%(1)<>room% AND tr%=room
    % PRINT 'CHR$ 131"A large troll
     leaves."
800 ENDPROC
810 DEF PROCatta
820 IF cts%(room%)=0 PRINT CHR$ 129
    "Attacking walls may be seen
     as"'CHR$ 129"insanity and has
     no effect."
830 IF (cts%(room%)AND 1)=1
    OR (cts%(room%)AND 2)=2
    PRINT CHR$ 134"Your blows bounce
     cleanly off the"'CHR$ 134"pedes
    tal."
840 IF (cts%(room%)AND 4)=4
    PRINT CHR$ 130"The troll just
     giggles!"
850 IF (cts%(room%)AND 8)=8
    PRINT CHR$ 131"The angry troll
     throws a large jewel"'CHR$ 131
    "at you."
    :PROCmsg(RND(4))
860 ENDPROC
870 DEF PROCmove
880 IF dir%(N%)=0 PRINT CHR$ 129
    "Can't go that way."
    :ENDPROC
890 room%=dir%(N%)
900 ENDPROC
910 DEF PROCmv
920 IF (jew%(1)<>0 AND jew%(2)<>0
     AND jew%(3)<>0) AND NOT (X%
     EOR 0)
    THEN IF ABS (jew%(3)-jew%(2))=
    ABS (jew%(2)-jew%(1)) PROCmsg(
    RND(4))
930 R%=RND(3)
940 IF R%<=2 troll%(1)=jew%(
    RND(3))
950 IF R%=3 troll%(1)=room%
960 IF troll%(1)=0 troll%(1)=
    RND(27)
970 PROCtroll
980 IF troll%(2)>0 AND (cts%(troll%(
    1))AND 3)=0
    :cts%(troll%(1))=cts%(troll%(1))
     OR 2
    :jew%(troll%(2)-1)=troll%(1)
    :troll%(2)=troll%(2)-1
    :PRINT 'CHR$ 132"You hear a
     distant WHOOOF!"
    :ENDPROC
990
1000 IF troll%(2)<4AND (cts%(troll%(1
    )) AND 2)=2
    THEN cts%(troll%(1))=cts%(troll%
    (1)) EOR 2
    :jew%(troll%(2))=0
    :troll%(2)=troll%(2)+1
    :PRINT 'CHR$ 132"You hear a
     distant SLUUURP!"
1010 ENDPROC
1020 DEF PROCtroll
1030 FOR N%=1 TO 3
1040 IF jew%(N%)=troll%(1) cts%(troll
    %(1))=cts%(troll%(1)) OR 2
1050 NEXT
1060 cts%(room%)=cts%(room%)
    AND 243
1070 IF room%=troll%(1) AND troll%(2)
    <>0 cts%(room%)=cts%(room%)
     OR 8
    :ENDPROC
1080 IF room%=troll%(1) AND troll%(2)
    =0 cts%(room%)=cts%(room%)
```

Castle of Fear listing

From Page 159

```
     OR 4
     :ENDPROC
1090 ENDPROC
1100 DEF PROCinv
1110 PRINT "You are carrying:-"'
1120 IF C%=0 PRINT CHR$ 134"Nothing
      of use."
     :ENDPROC
1130 FOR N%=1 TO C%
1140 PRINT "1 large ";coin$(N%);
     " coin."
1150 NEXT
1160 ENDPROC
1170 DEF PROCenter(enter%)
1180 PROCtroll
1190 VDU 26,12,28,0,0,39,13
1200 RESTORE 2170
1210 REPEAT
1220 PROCfind
1230 UNTIL room%=enter%
1240 PRINT "You are standing ";des$
1250 PROCcts
1260 PRINT
1270 last%=room%
1280 PROCdirs
1290 ENDPROC
1300 DEF PROCdirs
1310 IF room%<>14 PRINT CHR$ 134
     "I see a way ";
1320 RESTORE 2740
1330 FOR N%=1 TO 4
1340 READ des$
1350 IF dir%(N%)<>0
     THEN PRINT ;CHR$ (129+N%);des$;
     ",";
1360 NEXT
1370 VDU 127
     :PRINT
1380 IF dir%(5)<>0 PRINT CHR$ (131)
     "A Set of magical steps lead
      upward."
1390 IF dir%(6)<>0 PRINT CHR$ (134)
     "A hole in the floor leads down.
     "
1400 PRINT TAB(0,12)STRING$(39," ")
1410 VDU 28,0,24,39,13
1420 ENDPROC
1430 DEF PROCget
1440 IF room%<>5 AND cts%(room%)=0
      PRINT CHR$ 134"Nothing here
      worth taking."
     :ENDPROC
1450 IF (cts%(room%) AND 1)=1
     THEN PRINT "Get large coin."'
     "Taken."'"Shloop, the pedestal
      vanishes."
     :cts%(room%)=cts%(room%)
     AND 254
     :coin%(C%)=0
     :C%=C%+1
     :ENDPROC
1460 IF (cts%(room%) AND 2)=2
     THEN PRINT "Get large jewel."'
     "Can't the thing's stuck."
     :ENDPROC
1470 IF (cts%(room%) AND 4)=4
     OR (cts%(room%) AND 8)=8
     THEN PRINT "Get burly troll?"'
     "Nice try."'
1480 IF (cts%(room%) AND 8)=8
     THEN PRINT "Get large jewel."'
     "The troll won't let me."
1490 IF room%=5 PRINT "Get skeleton."
     '"One skeleton taken."'
     :PROCmsg(4+RND(2))
1500 ENDPROC
1510 DEF PROCdrop
1520 IF C%=0
     THEN PRINT CHR$ 133"Drop what?"
     :ENDPROC
1530 PRINT "Drop large coin."
1540 IF (cts%(room%) AND 2)=2
     OR (cts%(room%) AND 1)=1
     PRINT "The ";coin$(C%);" coin
      sticks to your fingers."
     :ENDPROC
1550 IF (room%<>23 AND room%<>10)
      coin%(C%)=room%
1560 IF room%=23 coin%(C%)=14
1570 IF room%=10 coin%(C%)=0
1580 PRINT "Dropped."
     :C%=C%-1
1590 IF room%=23 AND cts%(14)=0
      PRINT "The coin "coin$(C%+1);
     " rolls away down a hole  in
      the floor."
     :cts%(14)=1
     :ENDPROC
1600 IF room%=10 AND (cts%(10)
     AND 2)=0
     THEN PRINT "Buuuuurp."'"Just
      what I needed."
     :ENDPROC
1610 IF (cts%(room%) AND 4)=4
     PRINT "The burly troll shrieks
      and runs away."
     :troll%(1)=RND(27)
1620 IF (cts%(room%) AND 8)=8
     PRINT "The burly troll walks
      off sulking."
     :troll%(1)=RND(27)
     :PROCtroll
1630 PRINT "Whoosh! As the ";coin$(C%
     +1);" coin drops a pink"'"pedest
     al rises to catch it."
     :cts%(room%)=cts%(room%)
     EOR 1
1640 ENDPROC
1650 DEF PROCfind
1660 READ room%
1670 FOR N%=1 TO 6
1680 READ dir%(N%)
1690 NEXT
1700 READ des$
1710 ENDPROC
1720 DEF PROCcts
1730 RESTORE 2750
1740 N%=1
     :REPEAT
1750 READ des$
1760 IF (cts%(room%) AND N%)=N%
      PRINT des$
1770 N%=N%*2
1780 UNTIL N%=16
1790 ENDPROC
1800 DEF PROCquit
1810 PRINT CHR$ 136"QUIT!"'"Are you
      realy sure?"
1820 IF (GET AND &DF)=89
     THEN CLS
     :PRINT "Bye."
     :END
1830 ENDPROC
1840 DEF PROCmsg(N%)
1850 IF N%=1 PRINT "Suddenly, a massi
     ve hole opens up in"'"the ground
      beneath your feet. The shock"'
     "of landing kills you."
1860 IF N%=2 PRINT "A large pendulum
      swings in from the roof";"and
      neatly cleaves your skull."
1870 IF N%=3 PRINT "A massive boulder
      rolls in and flattens"'"you."
1880 IF N%=4 PRINT "A large spear
      glides down from above and";
     "kills you."
1890 IF N%=5 PRINT '"The skeleton
      didn't like been pulled"'"off
      the wall, and you now find
      yourself"'"chained there too!"
1900 IF N%=6 PRINT '"The skeleton
      promptly grabs you by the"'
     "neck and throttles you."
1910 IF N%<=6 PRINT '"So you loose
      again sucker!"
     :END
1920 IF N%=7 PRINT "Congratulations,
      you win, the elvies"'"mass
      around you and carry you away
```

→

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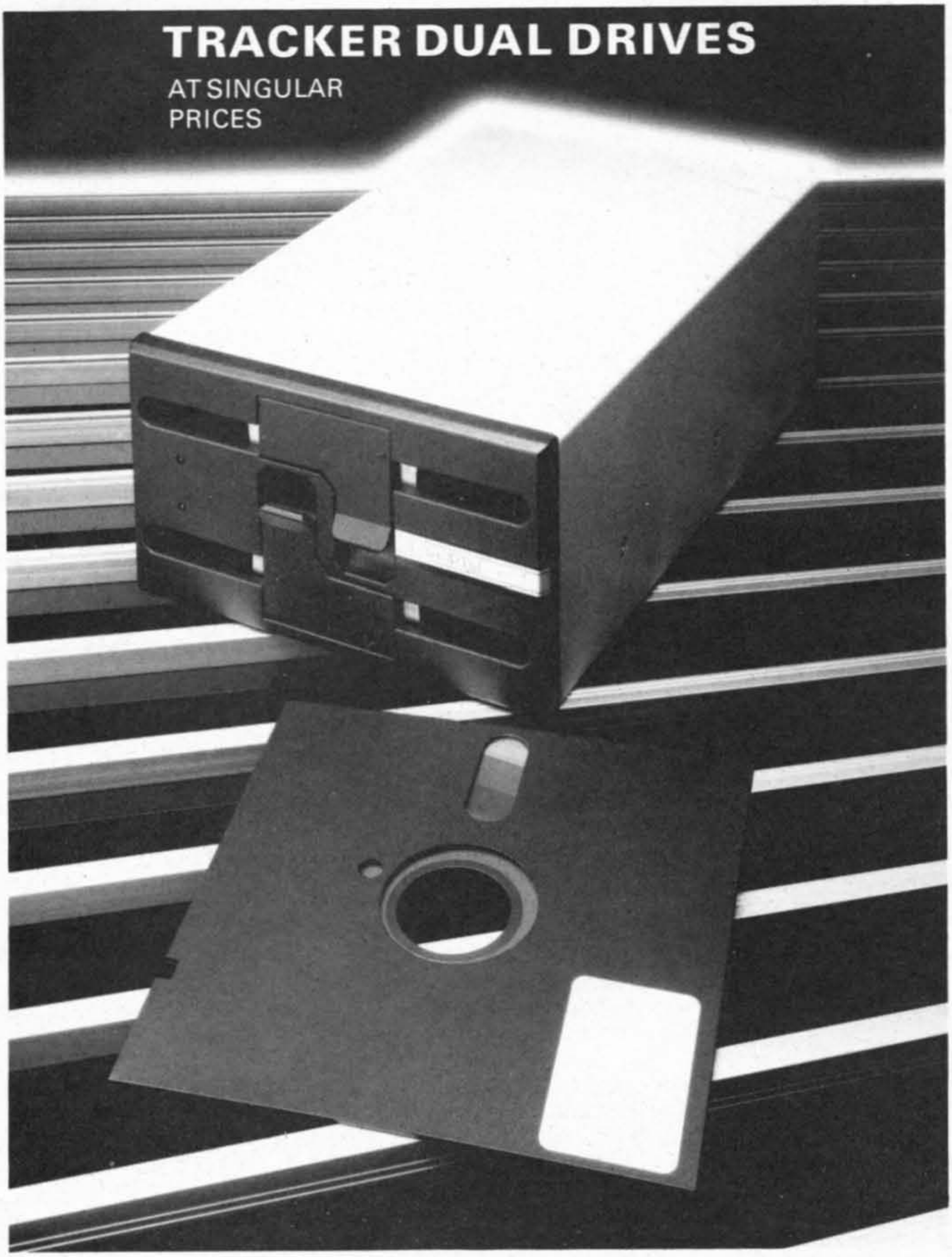

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Castle of Fear listing

From Page 160

```
     to"'"a hero's welcome."
     :END
1930 ENDPROC
1940 DEF PROCinit
1950 C%=0
     :N%=0
     :T%=0
     :X%=0
     :Y%=0
1960 room%=13
     :last%=17
1970 DIM dir%(8),cts%(27),troll%(2)
     ,jew%(3),coin%(3),coin$(3)
1980 des$=STRING$(255," ")
1990 RESTORE 2770
2000 FOR N%=1 TO 3
2010 READ coin$(N%)
2020 NEXT
2030 jew%(1)=3
     :jew%(2)=10
     :jew%(3)=25
2040 FOR N%=1 TO 27
2050 READ cts%(N%)
2060 NEXT
2070 troll%(1)=17
     :troll%(2)=1
2080 ENDPROC
2090 DEF PROCcent(msg$,C%,Y%,D%)
2100 X%=(39-LEN (msg$))/2
2110 IF D%=1
     THEN FOR N%=0 TO 1
     :PRINT TAB(X%-1,Y%+N%);CHR$ 141;
     CHR$ (128+C%);msg$
     :NEXT
     :ENDPROC
2120 PRINT TAB(X%,Y%);CHR$ (128+C%);m
     sg$;
2130 ENDPROC
2140 DEF PROCdbl(msg$,X%,Y%,C%)
2150 FOR N%=0TO 1
     :PRINT TAB(X%-2,Y%-1+N%)
     CHR$ 141CHR$ (128+C%);msg$
     :NEXT
2160 ENDPROC
2170 DATA 1,2,0,4,0,0,0
2180 DATA "at the bottom of a deepwel
     l."
2190 DATA 2,3,1,0,0,0,0
2200 DATA "in a misty N/S passage."
2210 DATA 3,0,2,6,0,0,0
2220 DATA "at the end of a misty
       passage."
2230 DATA 4,0,0,7,1,0,0
2240 DATA "a strange room with a
       very high ceiling."
2250 DATA 5,0,0,8,0,0,0
2260 DATA "in the torture chamber.The
      room is full of weird equipment
     .A   skeleton hangs from the
      wall and the    place is litter
     ed with cobwebs."
2270 DATA 6,0,0,9,3,0,0
2280 DATA "in a dank E/W passage.
      A cloud of green mist enters
      from the   west."
2290 DATA 7,8,0,0,4,16,0
2300 DATA "in the southeast cornerpas
     sage."
2310 DATA 8,9,7,0,5,0,0
2320 DATA "in a small, dank ante
       chamber."
2330 DATA 9,0,8,0,6,0,0
2340 DATA "at one end of a damp
       passage."
2350 DATA 10,11,0,0,0,0,1
2360 DATA "in the food store, a
       sign on the wall flashes 'FEED
      ME'."
2370 DATA 11,12,10,0,0,0,0
2380 DATA "at the south end of thekit
     chen."
2390 DATA 12,0,11,15,0,0,0
2400 DATA "at the north end of thekit
     chen."
2410 DATA 13,14,0,16,0,22,0
2420 DATA "in the guests lounge.
      asign above the north door
      says :-        'DON'T GO NORTH'.
     "
2430 DATA 14,0,0,0,0,0,0
2440 DATA "in the trap room. A
       sign on the wall flashes,
      I told you so!"
2450 DATA 15,0,0,18,12,0,0
2460 DATA "in a short connecting
       hall."
2470 DATA 16,17,0,0,13,0,0
2480 DATA "at the south end of thelon
     g dining room."
2490 DATA 17,18,16,0,0,0,0
2500 DATA "in the middle of the
       long dining room."
2510 DATA 18,0,17,0,15,0,0
2520 DATA "at the north end of thelon
     g dining room."
2530 DATA 19,0,0,22,0,0,0
2540 DATA "at the western end of
      along E/W hall."
2550 DATA 20,21,0,0,0,0,0
2560 DATA "at the south end of thekin
     g's bedroom"
2570 DATA 21,0,20,24,0,0,0
2580 DATA "at the north end of thekin
     g's bedroom"
2590 DATA 22,0,0,25,19,0,13
2600 DATA "at the eastern end of
       along E/W hall."
2610 DATA 23,0,0,26,0,0,5
2620 DATA "in the queen's dressing
       chamber."
2630 DATA 24,0,0,27,21,0,0
2640 DATA "in the queen's bedroom."
2650 DATA 25,26,0,0,22,0,0
2660 DATA "in Eliza's room."
2670 DATA 26,27,25,0,23,0,0
2680 DATA "at the southern end of
       a long N/S passage."
2690 DATA 27,0,26,0,24,0,0
2700 DATA "at the northern end of
       a long N/S passage."
2710 DATA N,1,S,2,E,3,W,4,U,5,D
     ,6,@,7
2720 DATA G,8,L,9,I,10,Q,11,w,12
     ,P,12
2730 DATA A,13,H,14,?,255
2740 DATA North,South,East,West
2750 DATA "A tall pink pedestal with
       a large coin  on it stands
       on the floor.","A tall blue
       pedestal with a large jewel
       on it stands on the floor."
      ,"A burly troll is gazing at
       you."
2760 DATA "A burly troll carrying
       a large jewel,   stands looking
       at you."
2770 DATA Bronze,Silver,Golden
2780 DATA 1,0,0,0,0,0,0,0,0
2790 DATA 0,0,0,0,0,0,1,0,0
2800 DATA 0,0,1,0,0,0,0,0,0
2810 DATA 30,"You're doing fine."
     ,40,"Why don't you make a map?"
     ,60,"Not much time left now."
     ,80,"We're all gonna die!"
     ,95,"Ah well, there goes another
      life."
2820 IF ERR =17
     THEN PRINT 'CHR$ 12"Escape is
      impossible."'"Hit a key."
     :REPEAT UNTIL GET <>0
     :RETURN
2830 REPORT
     :PRINT " In line ";ERL
2840 END
2850 IF ERR =17 RETURN
2860 REPORT
     :PRINT " In line ";ERL
2870 END
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

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We are bringing back the much talked-about feature of our first Manchester show.

Throughout the weekend some of Britain's top experts on the BBC Micro and Electron will be making guest appearances at the forum, held in a lecture theatre adjoining the two exhibition halls.

Whether you're a beginner or an experienced user, they will be delighted to answer all your questions.

On sale will be

BBC Micros, Electrons, Teletext adapters, Torch disc packs, BBC Buggies, Second Processors, ROM Expansion Boards, Grafpads, Books, Joysticks, Interfaces, Disc drives, Data recorders, Lightpens, Modems, Speech Synthesisers, Carrying Cases, Cables, Digitizers, VDU stands, Graphics tablets, ROM chips, Monitors, Printers . . .

PLUS *many thousands of software programs – games, educational and business packages.*

Reduced prices for School/College Groups

Entry only £1 per student if bookings are made in advance. Send your cheque (made payable to Database Publications) and SAE to:

Electron & BBC Micro User Show
68 Chester Road, Hazel Grove
Stockport SK7 5NY Tel: 061-456 8383

Valid for a minimum of 10 people

SAVE MONEY with our Special Travel Offer

Visitors to the Show can obtain cut-price rail tickets from ANY station in the United Kingdom

For full details write to:

Travel Offer, P.O. Box 1, St. Albans AL1 4ED with SAE or Telephone: St. Albans 34475 quoting: The Electron & BBC Micro User Show.

This voucher is worth 50p per head

ELECTRON & BBC MICRO USER SHOW

By handing in this voucher at the door you save 50p off the normal admission price of £2 (adults) and £1.50 (children).

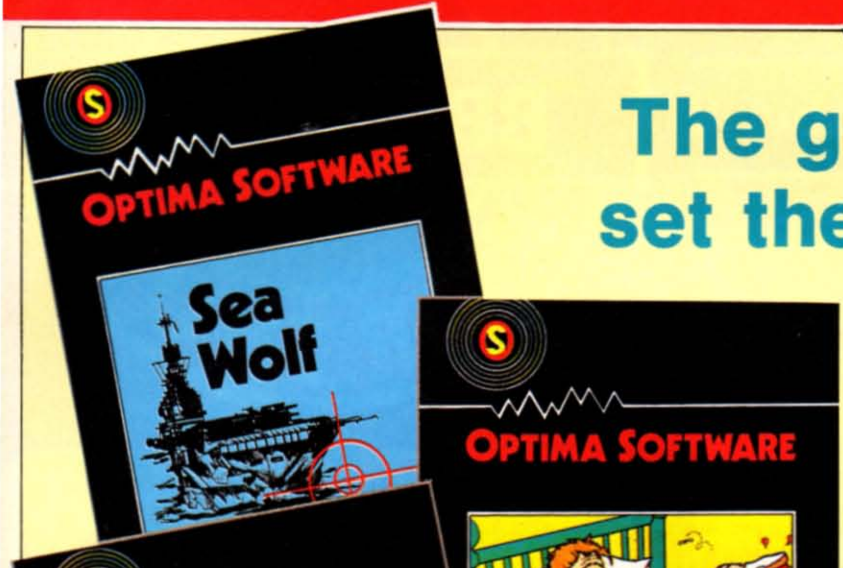
(Valid for a maximum of 4 people)

10am - 6pm, Friday, 31 August
10am - 6pm, Saturday, 1 September
10am - 4pm, Sunday, 2 September

Renold Building, UMIST, Manchester.

Number attending: ☐ 1 ☐ 2 ☐ 3 ☐ 4

OPTIMA SOFTWARE



The games that set the standard

SEA WOLF

So far all has gone well. You have successfully guided your submarine safely through enemy controlled waters and you are beginning to relax.

Suddenly alarm bells scream in your ears – you are under attack!

Desperately you scan the radar screen. Should you try to get him within range of your torpedoes, or attempt evasive tactics? Can you lead your crew to safety?

BED BUGS

The pests are after your feet and you'll have to move fast to stop them. Swot them with a jam sandwich or crunch them with your false teeth.

If you're desperate you can always phone for help. But whatever you do, do it quickly. You need cunning tactics and nimble fingers!

Bed Bugs guarantees hours of hilarity for the whole family.

OMEGA PROBE

Far out in the uncharted reaches of the universe lie the Omega zones from which no man has ever returned.

To explore this hazardous region the Earth's scientists have created the Omega Probe – the ultimate spacecraft.

As pilot of the probe, you face the unknown hazards of the Omega zones. Your mission: to survive.

This fast and furious machine code game with its tremendous graphics and many unique features takes arcade games to new heights of programming excellence.

Get these great games from your Acorn dealer or send off the coupon below to:

Optima Software Ltd, 36 St. Petersgate, Stockport SK1 1HL.

Sea Wolf

☐ BBC 'B' cassette £6.95
☐ Electron cassette £6.95
☐ BBC 40 track disc £8.95
☐ BBC 80 track disc £8.95

Bed Bugs

☐ BBC 'B' cassette £6.95
☐ Electron cassette £6.95
☐ BBC 40 track disc £8.95
☐ BBC 80 track disc £8.95

Omega Probe

☐ BBC 'B' cassette £6.95
☐ Electron cassette £6.95
☐ BBC 40 track disc £8.95
☐ BBC 80 track disc £8.95

☐ I enclose acheque payable to Optima Software Ltd.

☐ I wish to pay by *Access/Visa (*delete as appropriate).

Name ____________________

Address ____________________

____

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Card No. ____________________

Expiry date ____________________

Signed ____________________

Sqwhere listing

From Page 66

```
  10 REM ***********************
  20 REM **     SQWHERE     **
  30 REM ** (c) MICRO USER  **
  40 REM ***********************
  100 ONERRORGOTO710
  110 ENVELOPE1,1,3,-8,8,3,20,0,127,0
,0,-1,126,126:ENVELOPE2,1,1,1,1,5,5,0
,10,10,0,-100,0,127:ENVELOPE3,1,2,1,6
0,60,60,50,100,-5,0,-100,0,126:ENVELO
PE4,1,0,0,0,0,0,0,126,-1,0,-1,126,0
  120 *FX11,1
  130 *FX12,1
  140 MODE7:DIMS% 7:!S%=&08040201:S%!
4=&4010:VDU23;8202;0;0;0;0:SN%=0:P%=R
ND(68):Q%=RND(68):DX%=SGN(SIN(RND(10)
)):DY%=SGN(SIN(RND(10))):FL%=1:W%=32:
W1%=35:SC%=0:TM%=1000:SC1%=0:PPP=0:IB
%=0:HI%=0:GOTO540
  150 DEFPROCGR(CC%):CD%=CC%:VDU31,0,
0:FORY%=0TO23:VDU10,13,&90+CC%:NEXT:E
NDPROC
  160 DEFPROCP(Z%,X%,Y%):VDU31,X%DIV2
+1,24-Y%DIV3:C%=S%?((X%AND1)+(2-Y%MOD
3)*2):A%=135:ON Z% GOTO170,180,190
  170 VDU(USR&FFF4 AND&FF00)DIV256ORC
%OR128:ENDPROC
  180 IF(USR&FFF4 AND&FF00)DIV256ANDC
% VDU(USR&FFF4 AND&FF00)DIV256EORC%OR
128:ENDPROC
  190 F%=0:IF(USR&FFF4 AND&FF00)DIV25
6ANDC% F%=1
  200 ENDPROC
  210 DEFPROCF(CC%):IFCC%=1 SOUND2,2,
1,92 ELSE SOUND2,2,1,108
  220 FORT%=0TO69:PROCP(CC%,69-T%,0):
PROCP(CC%,T%,69):PROCP(CC%,0,T%):PROC
P(CC%,69,69-T%):NEXT:ENDPROC
  230 DEFPROCB:VDU31,0,0:PRINTCHR$129
CHR$157CHR$131"SCORE"CHR$132STRING$(1
5," ")CHR$133"TIME"CHR$135STRING$(6,"
 ")CHR$156;:ENDPROC
  240 DEFPROCSN:SN%=SN%+1:SN$=CHR$131
+CHR$141+CHR$157+CHR$132+"SCREEN"+CHR
$129+STR$SN%+STRING$(2," ")+CHR$156+C
HR$(&90+CD%)
  250 IFSN%>99 SN$=CHR$132+CHR$141+CH
R$157+CHR$129+"GAME OVER  "+CHR$156
  260 SN1$=STRING$(LEN(SN$)," "):PRIN
TTAB(10,11);SN$;:PRINTTAB(10,12);SN$:
FORD%=50TO200STEP4:SOUND3,4,D%,2:NEXT
:FORT=1TO3000:NEXT:PRINTTAB(10,11);SN
1$;:PRINTTAB(10,12);SN1$:ENDPROC
  270 DEFPROCBN:DB%=0:PROCP(3,P%+DX%,
Q%):IFF%=1 DX%=-DX%:DB%=1:SOUND2,-15,
150,1
  280 PROCP(3,P%,Q%+DY%):IFF%=1 DY%=-
DY%:DB%=1:SOUND2,-15,150,1
  290 IFDB%=0 PROCP(3,P%+DX%,Q%+DY%):
IFF% DX%=-DX%:DY%=-DY%:SOUND2,-15,150
,1
  300 PROCP(2,P%,Q%):P%=P%+DX%:Q%=Q%+
DY%:PROCP(1,P%,Q%):ENDPROC
  310 DEFPROCAD:AD%=ADVAL(0)AND3:*FX1
5,1
  320 IFFL%=1 AND AD%=0 AND INKEY(-67
)=0 AND INKEY(-98)=0 FL%=0
  330 IFFL%=1 ENDPROC
  340 IFAD%=1 OR INKEY(-98) DX%=-DX%:
FL%=1:SOUND3,-15,60,2
  350 IFAD%=2 OR INKEY(-67) DY%=-DY%:
FL%=1:SOUND3,-15,120,2
  360 ENDPROC
  370 DEFPROCGL:PROCGL6:PROCGL5:ENDPR
OC
  380 DEFPROCGL1:W%=RND(58)+2:W1%=RND
(58)+8:ENDPROC
  390 DEFPROCGL2:FORT%=0TO4:FORT1%=1T
O4:SOUND0,-15,4,1:PROCGL3(T1%,2):NEXT
T1%,T%:ENDPROC
  400 DEFPROCGL3(T1%,T2%):IFIB%=0ORIB
%=1ANDT%=0 PROCBN
  410 PROCAD:PROCST:IFTM%<=1 TM%=1:EN
DPROC ELSE T3%=T1%:ON T1% GOTO420,430
,440,450
  420 PROCP(T2%,W%+T%,W1%):ENDPROC
  430 PROCP(T2%,W%+5,W1%-T%):ENDPROC
  440 PROCP(T2%,W%+(5-T%),W1%-5):ENDP
ROC
  450 PROCP(T2%,W%,W1%-5+T%):ENDPROC
  460 DEFPROCGL4:FORT%=0TO4:FORT1%=1T
O4:SOUND0,-15,4,1:PROCGL3(T1%,1):NEXT
T1%,T%:ENDPROC
  470 DEFPROCGL5:SOUND3,3,10,15:T1%=R
ND(4):FORT%=1TO4:PROCGL3(T1%,2):NEXT:
ENDPROC
  480 DEFPROCGL6:SOUND3,3,10,15:FORT%
=0TO4:PROCGL3(T3%,1):NEXT:ENDPROC
  490 DEFPROCGP:PROCGL6:PROCGL2:PROCG
L1:PROCGL4:PROCGL5:ENDPROC
  500 DEFPROCIB:IB%=0:IFP%>W% AND P%<
(W%+5) AND Q%<W1% AND Q%>(W1%-5) IB%=
1
  510 ENDPROC
  520 DEFPROCST:TM%=TM%-1:SC%=TM%:PRI
NTTAB(10,0);SC%+SC1%;"  ";:PRINTTAB(3
1,0);TM%;"  ";:ENDPROC
  530 DEFPROCGG:PROCGR(RND(7)):PROCB:
PROCST:PROCF(1):PROCGL1:PROCGL4:PROCG
L5:ENDPROC
  540 REPEAT:PROCPC:PROCGR(1):PROCSN:
SK1%=RND(68):SK2%=RND(68):PROCGG:GOTO
550
  550 REPEAT
  560 IFRND(1000)<SN%*2 PROCGP
  570 IFRND(750)<SN%*5 PROCGL
  580 PROCST:PROCBN:PROCAD
  590 PROCIB:IFIB%=1 PROCGL6:SOUND1,1
,60,40:IB%=0:FORD%=1TO50:PROCGR(RND(7
)):NEXT:PROCF(2):SC1%=SC1%+SC%:TM%=TM
%+1:CLS:PROCB:PROCST::PRINTTAB(10,0);
SC1%+999:TM%=1000:PROCSN:CLS:PROCGG
  600 UNTILTM%=0:SN%=99:FORD%=200TO50
STEP-1:SOUND3,4,1.1*D%,1:NEXT:PROCF(2
):CLS:SC1%=SC1%+SC%:PROCB:TM%=TM%+1:P
ROCST:SN%=99:IFSC1%>HI% HI%=SC1%
  610 PROCSN:TM%=1000:SN%=0:SC1%=0:PR
OCPC:GOTO540
  620 DEFPROCPC:REPEAT:CLS:PROCGR(4):
PROCF(1):PROCB:REPEAT:PRINTTAB(13,11)
;CHR$130"SQWHERE?"+CHR$148;TAB(3,15);
CHR$134CHR$157CHR$133CHR$136"PRESS A
SWITCH TO PLAY  "CHR$137CHR$156CHR$14
8;
  630 PRINTTAB(6,20);CHR$131CHR$157CH
R$132"HIGH SCORE ="CHR$136CHR$129;HI%
;CHR$32CHR$137CHR$156CHR$148;:PROCBN:
PROCST:AD%=ADVAL(0)AND3:UNTILAD%>0 OR
 TM%=0 OR INKEY(0)>-1:TM%=1000:UNTILA
D%>0 OR INKEY(0)>-1:CLS
  640 PRINTTAB(14);CHR$131"SQWHERE?"'

  650 PRINTCHR$132"The object is to g
et the bouncing ball"'CHR$132"into th
e box."''CHR$129"To do this you chang
e the ball's"'CHR$129"horizontal and
vertical movement."''CHR$133"Pressing
 'Z' or Paddle button 0 changes"CHR$1
33;
  660 PRINT"the ball's horizontal dir
ection."''CHR$134"Pressing 'X' or Pad
dle button 1 changes"CHR$134"the ball
's vertical direction."''CHR$131"You
have a time limit of 1000 units"'CHR$
131"in which to complete each frame."
''CHR$129;
  670 PRINT"Good luck!!";TAB(3,22);CH
R$134CHR$157CHR$133CHR$136"PRESS A SW
ITCH TO PLAY  "CHR$137CHR$156;
  680 *FX15,1
  690 AD%=ADVAL(0)AND3:IFAD%>0 OR INK
EY(5)>-1 GOTO690
  700 AD%=ADVAL(0)AND3:IFAD%=0 AND IN
KEY(5)=-1 GOTO700 ELSE CLS:ENDPROC
  710 *FX11,30
  720 *FX12,3
  730 MODE7
```

This listing is included in this month's cassette tape offer. See order form on Page 193.

National Micro Centres
National Micro Centres

National Micro

Your starter for free.

For a start in computing, there's no better computer than the £399 BBC Micro.

(For confirmation of this, you can check any number of computer magazines.)

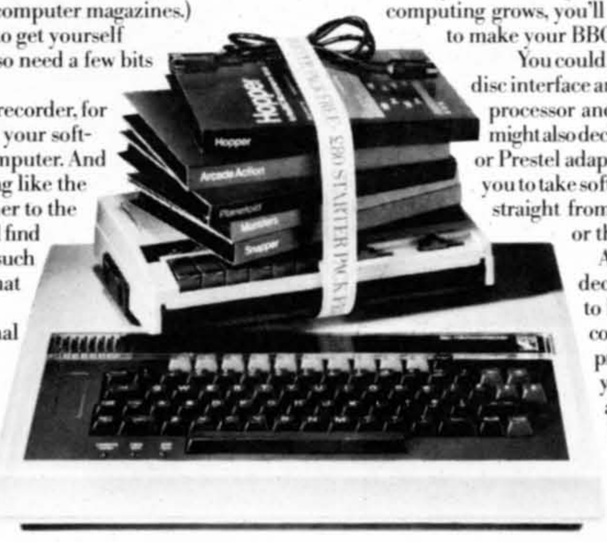
However, to get yourself started, you'll also need a few bits and pieces.

A cassette recorder, for instance, to load your software into the computer. And if you're anything like the average newcomer to the BBC Micro, you'll find yourself making such rapid progress that you'll soon be wanting additional programs.

For a very limited period only, you can get this extra hardware and software free when you buy a BBC Micro. Because you can choose between two special starter packs, each worth over £80.

One starter pack consists of a cassette recorder and five entertaining and absorbing software programs. (The brand of recorder and titles of software may differ from those illustrated.)

Or if you already have a cassette recorder, you can choose the other pack which consists of eight software programs and a cassette lead.



Either way, you'll save yourself a sum of money which you might find very handy later on. Because as your knowledge and enjoyment of computing grows, you'll probably want to make your BBC Micro grow.

You could gradually add a disc interface and drive, a word processor and printer. You might also decide on a Teletext or Prestel adaptor, enabling you to take software programs straight from the television or the telephone.

And if you really decide to get down to business, you could add a second processor to turn your micro into a formidable business machine for its size.

Unlike any other computer in its price range, the BBC Micro can go just as far as you want to go in computing. The first thing to do though is to start computing.

And with a free starter pack worth over £80, there'll never be a better time to start than now.

Use the order form on the opposite page before July 31, and state which free package you prefer:

Package 1: Free cassette recorder and five software programs.

Package 2: Free cassette lead and eight software programs.

LOW-COST PRINTERS

We have selected three of the most popular dot matrix printers. All allow you to condense or embolden text, offer high definition characters and allow you to produce clear-cut graphics and charts.

Brother

HP5 (30cps)	£148.62

Epson

RX80 (100 cps)	£236.52
RX80FT (incl. friction feed)	£273.91

For superb correspondence-quality printing you really need a daisywheel printer. Our choice, one of our top sellers, can also be used as a superior standalone electronic typewriter.

Silver Reed EX43

With special BBC interface	£342.83
Without BBC interface	£249.48

THE LATEST MONITORS

You can happily operate your BBC Micro with a domestic TV set. But more and more users are finding that for a really crisp picture you need a colour monitor. We offer a monochrom and three colour monitors.

Zenith

12" green screen	£70.44

Microvitec

14" colour – low-res	£189.05
14" colour – med-res	£284.50
14" colour – hi-res	£418.00

For the best of both worlds we recommend this 14" set which doubles as both a monitor ***and*** *a normal TV set:*

Nordmende

With BBC lead	£206.96
Plus remote control	£218.26

Speed your games with a joystick

Sureshot: A really high quality joystick for the BBC Micro.

- ★ *Self centering action.*
- ★ *Two fire buttons.*
- ★ *Rugged construction*

£16.50

Centres

MAIL ORDER DIVISION

Phone your order on 061-429 8080

**24 hours answering service outside office hours. Or use the order form below
You can also order via Prestel. Mailbox number 614298080 on Enterprise**

Add 15% VAT to all our prices ● Carriage FREE

Price and availability guaranteed to 31/8/84 except where indicated.

Wide range of DISC DRIVES

We only sell high quality drives that are cased in metal to avoid interference and data loss.

AMS 3" disc drives

AMS-3(S) 100k single	**£185.25**
AMS-3(T) 200k double	**£329.65**

Cumana slim disc drives

CSX 100 single	**£141.55**
CSX 200 single	**£183.35**
CSX 400 single	**£204.35**
CS 100 single	**£160.55**
CS 100E single	**£145.35**
CS 200 single	**£198.55**
CS 200E single	**£185.25**
CS 400 single	**£221.35**
CS 400E single	**£208.05**
CD 200 dual	**£289.75**
CD 400 dual	**£366.70**
CD 800 dual	**£409.45**
CD 400S 40/80 track switchable dual	**£445.55**
CD 800S 40/80 track switchable dual	**£474.05**

New LOW prices!

Pace slim disc drives

PSD1 100k single	**£141.55**
PSD2 200k single	**£201.40**
PSD3 400k single (40/80 track, switchable)	**£233.70**
PSD4 400k single (80 track)	**£204.25**
PSD5 200k (48/80 track, switchable)	**£213.75**
PDD2 400k double (40 track)	**£399.00**
PDD3 800k double (40/80 track, switchable	**£474.05**
PDD4 double (80 track)	**£396.15**
PDD5 double (40/80 track)	**£414.20**

Each drive comes with a FREE blank disc and a FREE Replica II – the best selling utility that enables you to transfer programs from tape to disc.

Colourful graphics with Chameleon

This is a MUST for programmers – take your pick from 4,096 colours!
Let Chameleon bring your programs to life with truly authentic colours. Mix and match the exact shades you require to give new depths of realism to your graphics. Choose from all the colours of the rainbow – and more! It's that simple ... with this amazing hardware add-on for the BBC Micro. *Phone for details.*

RGB version	**£73.53**
TV version	**£81.78**

Teach your BBC Micro to talk!

Sweet Talker *(Cheetah)*. The latest speech synthesis device for the BBC.

- ★ *Easily fitted – no soldering.*
- ★ *Uses allophone system – gives unlimited vocabulary.*
- ★ *All normal BBC sound features are unaffected.*
- ★ *Available now!*

Superb value at **£20.43**

THE HOBBIT REDUCED

A special low, low price for this high speed floppy tape system which requires no interface **£113.76**

LOAD & SAVE with confidence

From the wide selection available we recommend the ***Pye Data Cassette Recorder.*** *It's fully compatible with the BBC Micro and is guaranteed to prevent program loading and saving problems.* Plus free power pack and BBC lead **£33.04**

Link your BBC Micro to the world

Micronet
We invite you to join one of the world's largest databases.

To join Micronet you need:

- ● Prestel/Micronet subscription . **£13.00/qtr.** This will be invoiced to you by Prestel; application forms included with each order.
- ● Hardware
  *Modem 1000 .... **£56.48**
  or Telemod II (includes automatic transmit/receive switching) **£73.87**
- ● Software
  Cassette based **£13.00**
  or ROM based **£17.35**

Acorn Teletext Receiver
Enables you to download programs and access the Ceefax database **£185.87**

Pace Communications: Commstar easy to use communications ROM enables BBC to 'talk' with other micros (Modem required). **£28.09**

Our Top Ten Best Sellers

Chuckie Egg (A&F)
Plenty of thrills and spills in this progressive game which requires a great deal of skill at the higher levels. **£6.18**

747 Flight Simulator (Dr Soft)
A vividly realistic simulation of piloting a Jumbo Jet – written by a real pilot! **£6.22**

Fortress (Pace)
Astounding 3D graphics and furious action as, against fierce resistance, you guide your aircraft against enemy bases. **£6.93**

Hunchback (Superior)
An arcade classic: avoid spears, rocks and arrows as you attempt to rescue Esmerelda from the tower. **£6.22**

White Knight (BBC Soft)
Widely held to be the best Chess program for the BBC Micro. **£8.23**

Ghouls (Micro Power)
Dodge ghosts, spiders and other opposition in your attempt to rescue the power jewels from a haunted mansion. **£6.22**

Cylon Attack (A&F)
An interceptor pilot, you must blast the Cylons with your laser before they reach your mothership. **£6.18**

Omega Probe (Optima)
Widely acclaimed for its stunning graphics. You pilot the ultimate spacecraft through unknown hazards – a super-fast machine code arcade game. **£5.44**

Twin Kingdom Valley (Bug Byte)
Superb graphics, with over 175 different screens, put this best-selling adventure in a class of its own. **£7.43**

Killer Gorilla (Micro Power)
The all-time arcade blockbuster: scale the iron tower to rescue the maiden from the gorilla. **£6.22**

Selected business software designed for the BBC Micro

Cassette based

Acornsoft

Collectors Catalogue	**£9.32**
Database	**£9.32**
Desk Diary	**£7.78**
Forecast	**£9.32**
Membership Manager	**£9.32**
Personal Money Management	**£9.32**
View Printer Driver	**£7.78**

BBC Soft

Home Finance	**£7.83**
Record Keeper	**£10.80**

Diamondsoft

Business Accounts	**£14.05**
Flexifile	**£10.92**
Home Accounts	**£6.22**

Gemini

Cashbook	**£46.92**
Database	**£15.62**
Easi Ledger	**£15.62**
Final Accounts	**£15.62**
Graph Plot	**£15.62**
Home Accounts	**£15.62**
Invoice & Statements	**£15.62**
Maillist	**£15.62**
Payroll	**£31.27**
Spreadsheet	**£15.62**
Stock Control	**£15.62**
Word Processor	**£15.62**

New Gemini integrated accounts

Stock Control	**£78.22**
Invoicing and Sales Ledger	**£78.22**
Nominal Ledger	**£78.22**
Purchase Ledger	**£78.22**
Payroll	**£78.22**

Disc based

Acornsoft

Accounts Payable	***£19.53**
Accounts Receivable	***£19.53**
Invoicing	***£19.53**
Mailing System	***£19.53**
Order Processing	***£19.53**
Purchasing	***£19.53**
Stock Control	***£19.53**

ROM based

Acornsoft

View	**£46.80**

BBC Soft

Ultracalc	**£58.77**

Computer Concepts

Printmaster	**£25.20**
Wordwise	**£36.00**

Gemini

Datagem database	**£101.70**

Check for availability

Merlin

Scribe	***£46.92**

* *Must have Acorn DFS*

All prices on this page have been reduced by 10% (software) and 5% (hardware)
(Except BBC Micro special offer.)

ORDER FORM

**Post to:
NATIONAL MICRO CENTRES,
36 St. Petersgate,
Stockport SK1 1HL**

Item *Please supply the following*	Qty	Total £ p
	VAT 15%	
	Carriage	FREE
	TOTAL	

Attractive credit terms
Phone for details

Allow up to 14 days for software delivery.

Please indicate method of payment

☐ Cheque payable to National Micro Centres

☐ Access/Barclaycard No.

☐

Name ....
Address ....
....
Tel. No. ....
Signed .... *MU 8*

Input Routine listing

From Page 75

```
340 *FX15,1
350 REPEAT
360 a$=i$
    : c%=1
    : f%=e%MOD 10
    : i%=0
    : VDU 7
370 REPEAT
380 IF LEN (a$)>l%
    THEN a$=LEFT$(a$,l%)
    : VDU 7
390 VDU 23;10,32,0;0;0;
400 PRINT TAB(p%,v%); CHR$ 135;
     a$; STRING$(l%-LEN (a$),
    CHR$ 157); CHR$ 156;
410 PRINT TAB((p%+c%)MOD 40,v%+(p%+c
    %)DIV 40);
420 IF c%>l%
    THEN VDU 23;10,82,0;0;0;
    :
    ELSE VDU 23;10,96+32*i%,0;0;0;
430 £%=GET
440 IF INKEY (-2)AND £%<27
    THEN £%=£%+96
450 IF £%=&7F
    THEN PROCdel
460 IF (£%>&1F)AND (£%<&7F)
    THEN PROCchar
470 IF £%=9
    THEN PROCtab
480 IF (£%>&7F AND £%<&8C)
    THEN PROCarrow
490 UNTIL (£%=&0D)OR (£%>&8B)
500 IF £%=&0D
    THEN £%=0
510 UNTIL FNcompress OR £%<>0
520 PRINT TAB(p%,v%); CHR$ 32;
     a$; STRING$(l%-LEN (a$),
    CHR$ 32);
530 VDU 23;10,32,0;0;0;
540 =a$
550
560
570 DEF PROCchar
580 REM ========
590 *FX12
600 IF c%>l%
    THEN VDU 7
    : ENDPROC
610 IF f%=0 OR £%<64 OR (£%>90
    AND £%<97) OR £%>122
    THEN PROCaddchar
    : ENDPROC
620 IF f%=1
    THEN £%=£%AND 95
630 IF f%=2
    THEN £%=£%OR 32
640 IF INKEY (-2)
    THEN PROCaddchar
    : ENDPROC
650 IF (f%>2AND INKEY (-1))
    OR (f%>3AND (c%=1))
    THEN £%=£%AND 95
660 IF c%<2
    THEN PROCaddchar
    : ENDPROC
670 IF (f%>4AND MID$(a$,c%-1,1)=
    " ") OR (f%>5AND INSTR(Az$
    ,MID$(a$,c%-1,1))=0)
    THEN £%=£%AND 95
680 PROCaddchar
    : ENDPROC
690
700
710 DEF PROCaddchar
720 REM ===========
730 IF INSTR(v$,CHR$ £%)=0
    THEN VDU 7
    : ENDPROC
740 IF i%
    THEN SOUND 1,-5,200,2
750 a$=LEFT$(a$,c%-1)+CHR$ £%+
    MID$(a$,c%+1+i%)
760 c%=c%+1
770 ENDPROC
780
790
800 DEF PROCarrow
810 REM =========
820 *FX12,5
830 IF £%=&87
    THEN a$=i$
    : c%=1
840 IF (£%=&88)AND (c%<>1)
    THEN c%=c%-1
850 IF (£%=&89)AND (c%<=LEN (a$))

    THEN c%=c%+1
860 IF (£%=&8A)AND (INKEY (-1))

    THEN i%=0
870 IF (£%=&8A)AND (INKEY (-1)=0)

    THEN a$=LEFT$(a$,c%-1)+MID$(a$
    ,c%+1)
880 IF (£%=&8B)AND (INKEY (-1))

    THEN i%=-1
890 IF (£%=&8B)AND (INKEY (-1)=0)

    THEN a$=LEFT$(a$,c%-1)+CHR$ 255+
    MID$(a$,c%)
900 ENDPROC
910
920
930 DEF PROCtab
940 REM =======
950 IF c%>LEN (a$) c%=1
    ELSE c%=LEN (a$)+1
960 ENDPROC
970
980
990 DEF PROCdel
1000 REM =======
1010 IF INKEY (-2)
    THEN a$=""
    : c%=1
    : ENDPROC
1020 IF INKEY (-1)
    THEN a$=LEFT$(a$,c%-1)
    : ENDPROC
1030 IF c%=1
    THEN VDU 7
    : ENDPROC
1040 a$=LEFT$(a$,c%-2)+MID$(a$,c%)

    : c%=c%-1
    : ENDPROC
1050
1060
1070 DEF FNcompress
1080 REM ==========
1090 REPEAT
1100 IF a$=""
    THEN i%=0
    :
    ELSE i%=INSTR(a$,CHR$ 255)
1110 IF i%
    THEN a$=LEFT$(a$,i%-1)+MID$(a$
    ,i%+1)
1120 UNTIL i%=0
1130 IF RIGHT$(a$,1)=" "
    THEN REPEAT
    : a$=LEFT$(a$,LEN (a$)-1)
    : UNTIL RIGHT$(a$,1)<>" "
1140 IF e%>19
    THEN =TRUE
1150 IF LEFT$(a$,1)=" "
    THEN REPEAT
    : a$=MID$(a$,2)
    : UNTIL LEFT$(a$,1)<>" "
1160 IF e%>9
    THEN =TRUE
1170 IF a$=""AND £%=0
    THEN =FALSE
1180 =TRUE
```

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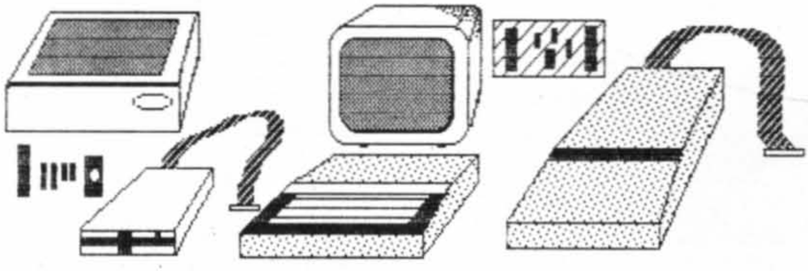

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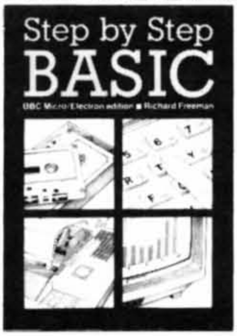

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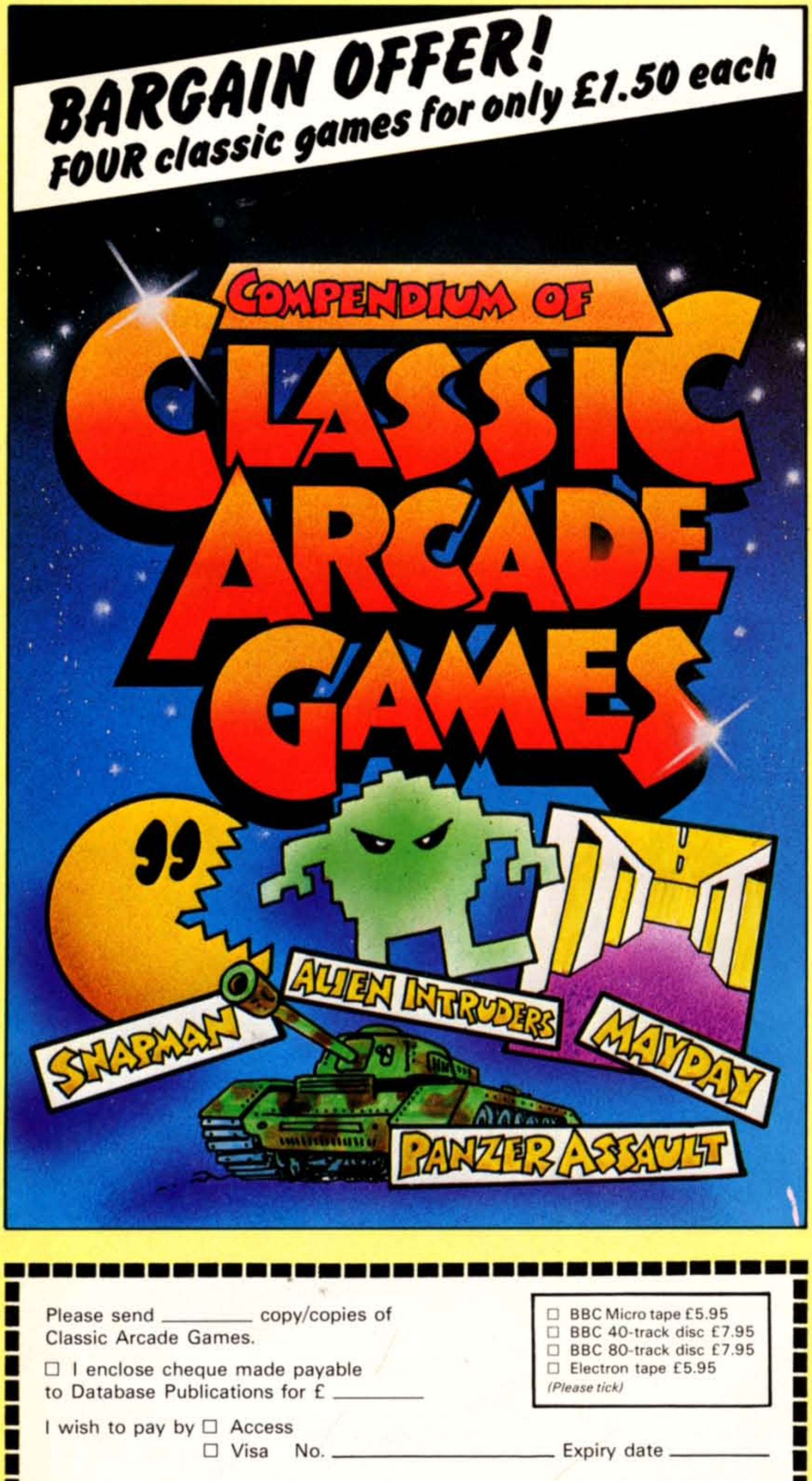

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MICROMAIL

Come on Bob, pull yourself together!

HAVING followed Bob's correspondence with Trev over the months, it occurs to me that Trev does not offer Bob much help.

I thought Bob might appreciate a simple, clearly reasoned approach to his basic problems, which are I feel sure traumatic psychosomatic phenomena, deliberately induced by denigration of his undoubted intellectual superiority, leaving him emotionally drained – to put it in a nutshell.

I have therefore written the following open letter to him in the hope that it will help him recover his erstwhile flair, courage, and open-minded analytical approach to life's troubles.

May I be forgiven . . . – **V.W. Budd, Warsash, Southampton.**

"BOB, I have become increasingly concerned about you. It is clear from your letters to Trev that you are down-trodden, repressed and entirely without confidence, and behind the veneer of bravado lies a deep inferiority complex masked by a totally unjustified massive egocentricity covering complete inadequacy.

If I had to sum it up in just one word – pathetic!

Pull yourself together man! Assert yourself! Off with the shackles, be a devil, and hang the consequences.

How about flinging a few GOTOs and GOSUBs around to show you just don't care? Tell A. to GOTOhell, GOSUBmerge her head in the washbasin, or GOTObed. (Not knowing A. all that well, I wouldn't know whether to follow the last with a procedure or a basic function.)

Try PROCbe_quiet or FNhands_off_my_beeb. Why not leave a MENU on your monitor with a message threatening mayhem if it is not implemented?

Where is that porcine chauvinism for which you are renowned among your friends?

Frankly Bob, unless you are prepared to make a stand, you will find yourself leading a totally structured life with none of the thrills of being a man with independent VIEW and the words to process it – a procedurally functioning robot.

I suppose A. may well read this and that any chance I may ever have had of being a regular visitor are finished for all time.

It's a pity Bob, for I was thinking that one day you would give me a few tips on using my Beeb as I don't seem to be very confident about it.

Ah well, we all have our problem, eh?"

– Best Wishes, Vic.

High priority is the secret

MR Gaunt's fears, in the June 1984 Micromail about the compatibility of the 6502 second processor and a non-standard DFS are quite understandable.

My experiments with the second processor however, suggest that many existing DFSs will work quite happily with the DNFS chip, supplied with the second processor, also installed.

All that is necessary is that the DFS which you wish to use must be in a higher priority sideways ROM socket than the DNFS – that is, to the right of it in the four sockets under the keyboard.

The essential code in the DNFS chip appears to relate to the Tube rather than the disc filing system part of it.

The main exception to this is the Kenda DMFS which I have installed. This uses the NMI vectors at page &D00 which the Tube also wants to use.

One minor problem was experienced with the LVL double density DFS, which tended to leave the disc drives running.

This was apparently a problem with earlier versions of this system and was overcome so I see no reason why it cannot be solved again.

The other problem found was that Basic programs saved from the original machine may be saved with re-load addresses in the &FFFFXXXX range.

This means that, with the second processor running, they will be loaded into the wrong memory area and will not run. I think that a disc sector editor should overcome this.

Unlike a DFS, many sideways ROMs are incompatible with the second processor. Except for Acornsoft ROMs, like View, and languages, which includes Beebug's Exmon, most ROMs will not work properly if at all.

Similarly any program which writes directly to screen memory will not work. This includes many popular arcade games, although these do not need the second processor on anyway. – **Colin Bignell, Littlehampton, West Sussex.**

More points on the 6502

IN reply to the letter from Mr Peter Gaunt in the June edition of The Micro User, the solution is quite simple.

When upgrading to the 6502 second processor, the instructions tell you to remove any existing DFS and NET ROMS from the BBC Micro and fit the new single DNFS ROM supplied which contains DFS, NET and Tube operating routines.

Thus, any additional facilities offered by an alternative DFS are lost.

The solution is to fit any alternative DFS ROM and the new DNFS ROM together, but to ensure that the DNFS ROM has a lower priority.

In this way the Tube operating routines are still initialised on BREAK, but any DFS command will be handled by the higher priority DFS ROM.

I would also like to raise the following points about the 6502 second processor.

I have a Computer Concepts Graphics ROM installed in my machine which enables commands such as:

```
*CIRCLE 640,512,200
```

to draw a circle of radius 200 in the centre of the screen.

Resident integer variables (A%–Z%) can be substituted for any of the parameters. This method will not work across the Tube though, for while integer parameters will work, resident integer variables will give unpredictable results.

It appears that the resident integer variables of the 6502 second processor are independent of the I/O processor and are not passed across the Tube. The solution to this problem is to rewrite the line using the OSCLI command in Basic II.

Thus:

```
*CIRCLE 640,512,R%
```

becomes:

```
OSCLI("CIRCLE 640,512,
"+STR$(R%))
```

When using the OSCLI command, the complete value of the string is calculated before it is

→

MICROMAIL

From Page 177

passed across the Tube and will work with or without the 6502 second processor connected.

One final point. Have any of your readers managed to get the Watford Electronics Beebfont ROM to work across the Tube? I haven't yet! – **Mr R.A. Whiting, Uxbridge, Middlesex.**

Thank you Watford

A LETTER in the June issue of The Micro User came from a reader who was worried about his DFS and the second processor. I have the processor and the Watford DFS.

The new Acorn DFS is essential to the processor because it contains software for it, and must therefore be given a priority position.

I tried all sorts of complicated tricks in order to engage the Watford DFS, now in a non-priority position, including cancelling out the Acorn one, without success.

Eventually I wrote to Watford and was given the extremely simple answer – W with Break – which engages the Watford DFS and so makes all discs formatted with it available as before.

I would like to say a public thanks to Watford for an immediate and helpful reply to my letter. – **F.H. Bradford, Penzance, Cornwall.**

Shades program

I AM 11 and my father regularly subscribes to The Micro User for me and my brother. We both find it excellent, and the best value for money around.

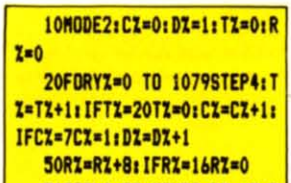
With this letter I send a very short program I made up myself which powerfully demonstrates the BBC's graphics in the form of a host of shades.

The BBC will fill the screen with some shades, then waits for you to press a key and carries on with some more.

It uses all the possible combinations of colours, and makes the shades with rows of dots.

C% and D% are two colours which make up the shade, R% sets where each line of dots should start, Y% is the graphics Y coordinate and T% is incremented until 20 then the colour changes and it reverts to zero. – **David Graves, Shrewsbury, Shropshire.**

P.S.: I would like to see in your magazine a professional art program for the keyboard with arcs, shades etc. I have tried to write one but it isn't brilliant!



```
   10MODE2:C%=0:D%=1:T%=0:R
%=0
   20FORY%=0 TO 1079STEP4:T
%=T%+1:IFT%=20T%=0:C%=C%+1:
IFC%=7C%=1:D%=D%+1
   50R%=R%+8:IFR%=16R%=0
   51GCOL0,C%:MOVE8-R%,Y%:P
LOT21,1279,Y%
   52GCOL0,D%:MOVER%,Y%:PLO
T21,1279,Y%
   60NEXTY%
   70A=GET:CLS:T%=0:GOTO20
```

Handling procedures

I WOULD like to point out that contrary to the article which appeared in Programmers' Workshop in the July issue of The Micro User, procedures are not handled by the Basic interpreter in the same way as subroutines.

When the interpreter encounters a GOSUB it saves the position of the instruction following the GOSUB and then searches for the line number specified by that GOSUB, starting at page.

Each time the same subroutine is called, the interpreter will repeat this process, since it makes no record of where the subroutine is in the program.

If page is set to a different value, it is therefore possible to get the computer to execute different subroutines as explained in the article. However this is not the case with procedures.

Each time the interpreter comes across a PROC in a program, it always goes to an address pointed to by the contents of &4F6-&4F7.

If the contents of this address is zero, then the interpreter knows that this is the first procedure that it has encountered, and so it will search through the program for a corresponding DEFPROC.

The error 'No such FN/PROC' will be generated if it can't find the matching DEFPROC, otherwise it will set up an information block about the procedure (PIB).

Each information block contains the name of the procedure and the address where it is defined in memory, along with a pointer giving the location of the next PIB, the address of the first PIB being stored at &4F6-7.

In the article, the final version of PROG 1A was used to demonstrate how different definitions of a procedure could be executed by changing the value of page. This only worked because the program kept resetting LOMEM, which also sets the contents of &4F6-7 to zero.

If line 130 of PROG 1A is changed to GOTO 45, then the PROC executed after each input will be the same PROC that was initially chosen, regardless of any subsequent selection made. – **R.S. Talbot, Stockport.**

Teac drive problems . . .

I AM writing regarding the letter in the June edition of The Micro User from M.J. Waldren warning people about problems with the latest Teac drives and the Acorn .90 DFS.

There does seem to be a bug in the Acorn .90 DFS which has been cured in the later versions. This affects most of the latest (LSI) drives that have a solenoid head and not only the Teac.

The same problem exists on the Mitsubishi drive used by Acorn.

The actual solution – apart from changing the DFS – is to apply a small modification to the drive itself. All Teac drives that have left our factory since January/February of this year have had this modification applied.

All drives bought from us prior to that date that need modification are rectified free of charge, subject to carriage costs.

The new disc filing system supplied by Acorn for use with second processors do not have the problem associated with the Acorn .90 DFS.

I would like to dispel all rumours that Teac drives are not compatible with the BBC Micro.

Teac drives – from our experience – are one of the most reliable drives available and we understand that Acorn will be using them in the near future. – **Vig Boyd, Viglen Computer Supplies.**

. . . the cure is simple

WITH reference to the letter from M.J. Waldren in the June edition of The Micro User regarding the failure of Teac drives from Twillstar Computers to work with Wordwise and the (official) 0.90 Acorn DFS.

We encountered the same problem. After returning one of the drives to Twillstar, only for them to declare it okay, we set about solving the problem ourselves.

The cure is quite simple. A 22 uF 16v (or similar) capacitor should be soldered from Pin 16 (load head signal) to ground on the disc drive PCB.

This stops the head coming away from the disc on file transfers, making them behave like the earlier non-LSI version of the drive. – **P. Dilley, Electronics Workshop, Polytechnic of Central London.**

Acorn can't be blamed

WE read with interest the letter of Ian Hassall in the June Micro User and feel that this bug is rather inconsequential, and that Acorn can hardly be blamed for not spotting it.

However if he feels that this cramps his structured programming style perhaps he should try

● *Want to write to Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.*

running Basic 2.2.

This is supplied, free of charge, by Acorn, when their Z80 second processor is purchased. Having tried his program line on the Z80 system we can put his mind at rest with the fact that all that happens is a Line Space error, and the system does not crash. – **A.S. Clarke and P.C. Vigay, Clanfield, Hampshire.**

Pity the poor schools

RE the report on an anti-pirate breakthrough by A & F, I am still entitled to make a working copy of any commercial tape I purchase, so the lawyers tell me.

If A & F are successful in their scheme to stop both computer dumped and audio copies, it may matter little to the honest computer addict (if there is still such a person).

But pity the schools, especially those like mine who use computers with 4-year-olds upwards. With up to 180 children and 10 staff handling tapes it is very very easy for a tape to be made unusable, even with sweaty hands let alone literally destroying a minute part of the tape.

At from £5 to £15 a time we can hardly afford the tapes, let alone replacements, when the inevitable happens. – **D. O'Donnell, Newcastle upon Tyne.**

Agricultural answers

WE read with interest Mr Gibbon's letter in May's Micro User enquiring about agricultural programs.

We have been writing them for three years specifically for use on the Commodore 64, but have recently been converting them to run on the BBC model B.

We supply the following range:

Croplan, an arable management program which is available now on the BBC.

Sowplan, a sow management program which will be available on the BBC in early July.

New Ledger, an agricultural accounting program.

Beeftek, a beef cattle rearing program.

The last two will be available later this year. We will be pleased to supply any further information on any of our programs. – **A.M. Dimmick, Amplan Management Systems, Whitestone Lodge, Thirlby, Thirsk, North Yorkshire.**

Software for farmers

IN reply to the letter from D.P. Gibbons, who wished to obtain programs for farm planning, budgeting and accounting, my partner and I have recently set up a company, Gap Software, to deal with the needs of farmers and market gardeners using the BBC Micro and other computers.

If he, and anybody else who is interested gets in contact with me at the below address we shall endeavour to help them. – **Rupert Hollom, 'Dore Mill', Abbeydore, Hereford HR2 0AA.**

Pointing the vector

WHEN glancing through the User Guide (page 452), I found that you could intercept the vector address of the operating system subroutines to point them to your own program.

The following commands show this in action:

```
!&70=&EE2007A9
!&74=&DEC54CFF
```

This is the actual program, and now we have to get the vector to point to it, in this case OSRDCH. So we now do this to turn my program on.

```
?&210=&70:?&211=0
```

This will now make the speaker emit a beep every time a key is pressed, apart from Break which will re-allocate the vector addresses when pressed.

*To change the duration of the beep use *FX 214, DURATION, and to change the pitch use *FX 213, PITCH.*

If you press Break the noise will stop, so type in:

```
*KEY10 ?&210= &70: ?&71=0|M
OLD|MLIST|M
```

You may now program as usual, but with the speaker emitting your specified noise when a key is pressed. – **D. McAllister, Shefford, Beds.**

Colour for Aviator

FOR those who would prefer to have a coloured background for the superb Aviator simulation, here is a program which will generate one without the need to break into the main program, which is well protected machine code.

It works by detecting the change to Mode 5 (line 130) then performing the machine code equivalent of VDU19,0,4,0,0,0 (lines 150 to 180). Line 190 then restores the intercept vector to normal.

In order that the intercept can be activated for the disc users who have to boot their disc, the Break action is programmed by lines 250 to 270 to set the intercept vector initially, using line 110.

Line 200 then cancels this action once the VDU call has been sent, so that the Break key will not lock up on leaving the simulation (thanks to Andy Armstrong of HCCS for this line).

Cassette owners should press Break to activate the intercept before CHAINing their Aviator program.

The background colour is set to blue in line 170. This can of course be altered if required – simply change the 4 to give the preferred colour.

To test the intercept, press Break after RUNning this program, then MODE 5. If all is well a blue Mode 5 screen will appear.

Then SAVE the program for future use and RUN it again before using it with Aviator. – **Peter Vasey, South Shields.**

```
   10REM ##################
###########
   20REM BLUE HEAVENS by Pe
ter Vasey
   30REM     (C) THE MICRO
USER
   40REM DISC/CASSETTE
   50REM Press BREAK to act
ivate
   60REM for cassette versi
on
   70FOR N% =0 TO 3 STEP3
   80P%=&A00
   90[OPTN%
  100LDA #&B:STA &20E:LDA #
&A:STA &20F
  110RTS
  120CMP #5: BNE notyet
  130JSR &E0A4
  140LDA #19:JSR &FFEE
  150LDA #0:JSR &FFEE
  160LDA #4:JSR &FFEE
  170LDA #0:JSR &FFEE:JSR &
FFEE:JSR &FFEE
  180LDA #&A4:STA &20E:LDA
#&E0:STA &20F
  190LDA #247:LDX #0:JSR &F
FF4
  200LDA #0
  210.notyet JMP &E0A4
  220]
  230NEXT
  240*FX247,76
  250*FX248,0
  260*FX249,10
```

Beebug replies

WE take strong exception to a news item which appeared in the June 1984 issue of Micro User.

This implied that Beebug was what it called a "pseudo user group", and that we had attempted to "muscle in on the

→

MICROMAIL

From Page 179

user group scene", maintaining that we had been "expelled" by the Association of Computer Clubs (ACC) because we were a commercial group with no amateur status.

In practice, although it is a fine point, we were not expelled; the ACC was reconstituted with new rules in October 1983 and now requires all affiliated clubs to be amateur.

Like a number of other previously affiliated clubs, Beebug does not meet with this condition; though we are informed that we could apply for so-called corporate status of the ACC if we so wished.

To say that we have been expelled is to give quite the wrong impression. We have committed no misdemeanour, and are on good terms with members of the ACC executive.

The article also implies that we are a "pseudo user group" because we are not an amateur club. This is patent nonsense.

A footballer does not become a psuedo-footballer when he moves from amateur to professional status.

Or to take another example, the RAC (Royal Automobile Club – user support for car owners) is not a "pseudo" motoring organisation because it is commercial.

In practice it is only by being commercial that the RAC can provide the service that it does.

It is the same with Beebug.

It is only possible to provide our current level of support for BBC Micro users by being commercial – by employing full time editorial, software and production staff etc.

At the same time however, we have a great respect for the many non-commercial computer clubs and societies; each has its own part to play in supporting microcomputer users. – **Beebug.**

STEPs are so easy

IN answer to G.K. Gifford's request in the May 1984 Micro User for a STEP facility combined with TRACE ON, this is easily achieved on the BBC.

RENUMBER your program to ensure all the line numbers are 10,20,30 . . .

Set a red function key to give Y=GET and type AUTO 15.

With one finger on Return and another on your red function key insert Y=GET into every line whose number ends with a "5" till the end of the program.

Your program now looks like this:

```
10 PRINT"THIS ROUTINE"
15 Y=GET
20 PRINT"ENABLES YOU TO"
25 Y=GET
30 PRINT"STEP THROUGH THE"
35 Y=GET
40 PRINT"PROGRAM"
45 Y=GET
50 PRINT"DON'T FORGET TO"
55 Y=GET
60 PRINT"TYPE 'TRACE ON'"
```

Hit any key to step the program. Obliterate the pentatonic lines after debugging.
– David Way, Schlumberger, Australia.

If you want more from your MICRO

µpGRADE

IT

UPGRADE'ing your BBC micro (model "A" or "B") is the simplest, most cost effective way of dramatically improving its capabilities. An **UPGRADE** gives you access to the world's largest library of professional software and clears the way for future expansions by adding a Z80 A second processor 64K of additional RAM, and a flexible disk drive controller to your already powerful BBC micro. An **UPGRADE**'s ability to run TRUE CP/M rather than a CP/M compatible operating system is one of the features that make an **UPGRADE** the sensible choice. Couple this with its ability to handle disk drives independently from the BBC micro and your ability to choose what disk drives to use (3½", 5¼" or even 8") and you can see why an **UPGRADE** is the only choice.

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On probation

I AM a probation officer interested in developing the use of the BBC Micro in probation work with clients.

In particular I wish to obtain programs which examine offending behaviour and provide welfare rights information.

I have so far developed two programs which I would be willing to exchange with anyone working along similar lines, and would welcome correspondence about such programs. – **Chris Tayler, Probation Centre, 3 Birmington Road, Chesterfield S41 7UG.**

Not quite right, indeed!

I NEVER cease to be amazed at those who continually belittle the excellent work done by those people at Acorn who wrote the BBC operating system and BBC Basic. "Haven't got it quite right" indeed! (Mr Ian Hassall, in the June Micromail).

Any Beeb owner who starts coding GOTOs (particularly at line 10!) has wasted his money buying this particular machine. Anyone coding unconditional recursive GOTOs has wasted his money buying ANY machine. And anyone who fills a whole multi-statement line with unconditional recursive GOTOs DESERVES to get the bird! Acorn got it QUITE right!!!

Sorry, Ian, but you asked for that one. Anyway, for another of Acorn's appropriate little comments try the statement: RENUMBER,i with i (the line number increment) greater than 255. – **Paul Holgate, Bramcote, Nottingham.**

Pottery puzzle

I WAS asked by my brother in law if I could write a program which would help him at his pottery.

Its purpose is to determine the best mix of various materials (of known chemical composition) to approximate to the known "target" composition of the type of glaze chosen.

I am struggling to devise an algorithm, avoiding large arrays, which will select all permutations of the materials (for example any 8 from 10 – as on the coupons) for further calculation in another PROCedure.

Can any Micro User reader help? – **N. Robertson, 9 Hunter Drive, Stonehaven, Scotland AB3 2BG.**

Making your Basic programs unlistable

COULD you please tell me how to make my Basic programs unlistable.

*I have conquered the Escape key with an ON ERROR GOTO and the Break key by defining it as *Key 10, but they can still be listed before they have been run and they can be listed by typing OLD after Ctrl and Break.* – **J. Frankyn, Forest Gate, London.**

● It is possible to stop someone listing a program after typing LIST by inserting control codes into the listing, as outlined below.

Firstly, insert line zero into the program, exactly as it appears here:

```
0 REM**********
```

The eight asterisks are used to reserve eight bytes for the necessary control codes. Now enter the following:

```
!(PAGE+5) =&7F7F7F7F
!(PAGE+9) =&0015033E
```

If you now try to list your program all you should get is a prompt on the screen.

The Escape key can be turned off by using *FX200,1 and if you use *FX200,3, then memory will be cleared on pressing Break.

It is also possible to intercept a control break key by entering a JMP instruction in machine code at address &287 to &289. This can be done by entering:

```
P%=&287
[JMP &0287]
```

If you now press Ctrl Break the BBC Micro will keep jumping to &287 in a continuous loop, and to get round this you must turn the machine off.

Strings got tangled up

SOME time ago, I sent an article regarding comments made by David Lewis on page 141 of the April issue of The Micro User.

In particular, I referred to the 4 byte string information block and how it could be used during sorting of string arrays.

While my comments were in essence correct, the sample chunk of Basic supplied which supposedly sorted a string array does not work.

The string sort section should be – and this one works:

```
  200 FOR I%= 0 TO X%-1
  210   FOR J%= I%+1 TO X%
  220      S%= firstptr% +I%
*4
  230      E%= firstptr% +J%
*4
  240      IF A$(J%) <A$ (I%
) T%= S%!0: S%!0= E%!0: E%!
0=T%
  250   NEXT
  260 NEXT
```

The above code will not actually move any strings around in storage, it merely shuffles the string information blocks into the correct order.

As each swap requires only 4 bytes to be moved, it follows that this method is much faster, as well as not producing "garbage" areas in the micro's memory. – **Stefan Neuman, Yatton, Bristol.**

Frogger commands

THERE seems to have been a slip-up in the letter I sent you for the June edition of The Micro User.

To LIST Frogger, the correct commands are:

```
*LOAD FROG2
PAGE=&1200
LIST
```

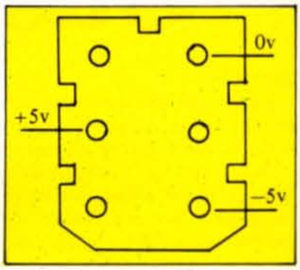
– **Peter Bevin.**

The power of Cook?

MIKE Cook seems to have made a mistake in the drawing of the Beeb's power socket in the modem article in the July 1984 Micro User.

The 0v appears at the bottom and the –5v at the top. The Advanced User Guide has these the other way up. Is the User Guide right? – **Hugh Peters, Chelmsford, Essex.**

● Sorry about that – here's the correct diagram:



Quaking keyboard

WELL done on the Micro Olympics program (I bought it on tape from W.H. Smith), but I daren't play it too much as the requirement to "hit two keys as fast as you can" is knocking hell out of my keyboard. What do you have to say to that, chaps?

Micro User is an excellent publication, possibly the only other one to be around in a few years time.

Oh, by the way, at the next exhibition, could you get your exhibitors to put their monitors at a high level so that other customers can see the software? – **Dennis Golding, Prestel Mailbox 034421056.**

● Thanks for the kind words –

→

MICROMAIL

From Page 181

Micro Olympics is great fun, isn't it? You don't really have to worry about the keyboard. You've got a completely free choice of keys, so you can spread the load over the keyboard, which means wear is even less than on standard games.

Actually our lads have been hammering away at the same keys all the time it's been developed, and there has been no noticeable harm done.

As for the monitors, it's a good point. We do try to encourage exhibitors to give high level displays, but in the end it's their decision.

Wordwise unworried

THE June 1984 issue of Micro User carried a letter headed "Wordwise worry" on page 177. It refers to a problem saving Wordwise text onto discs.

However the problem is nothing to do with Wordwise, which is only coincidentally connected. The inference that Wordwise is somehow incompatible is misleading and unfair.

Perhaps in future you could be more wise with your words and choose less emotive headings.

Readers may not be aware that a set of switches may be fitted on the keyboard to define various control timings for use with discs.

Contrary to popular beliefs, disc drives are not all the same, they are complicated devices which need to be treated with care.

*The BBC Micro should be configured for use with a particular disc drive by fitting the switches on the keyboard or, less conveniently, by using the *FX255 command provided.*

The reason why people notice the problem when saving Wordwise files is that it uses data files.

The same problem will occur for a program written in Basic which creates a data file. The longer the file is, the greater the chance that a fault will occur.

When the write-head of a disc drive is "clicked" down onto the disc to start writing data, there is a minute amount of bounce.

For any given disc drive there is a certain delay time required for the head to settle. If this delay is insufficient, then data is written (or not) while the head is still bouncing. This is why a disc fault occurs.

The problem is worst using an Acorn 0.90 DFS and while writing data files.

*The cure is to extend the disc head settle time – one of the parameters controlled by *FX255 or the keyboard switches.* – **Rob Pickering, general manager, Computer Concepts.**

And finally, with tongue firmly in cheek . . .

Buster pays a visit...

Dear Trev,

I think you may have been hearing some strange stories about me. Please take no notice of them, they're all true.

It all started when Deidre went on holiday for two weeks. She asked A. if she could leave her cat, Buster, with us. Of course Andrea agreed readily, saying that it would be company for her "while Bob's upstairs playing with his thing".

The Friday arrived and so did Buster. You know those lovely looking moggies from the Pusskas adverts? Well Buster was nothing like them or, rather, he was a combination of them all. Part tabby, part Persian, part allsorts with more than a touch of werewolf.

I wouldn't like to meet him when there's a full moon. (Mind you, that's what I used to say about A.)

He looked like he'd been assembled from a kit of parts by someone who didn't like cats and I was fairly certain that, if I was brave enough to look underneath the flea collar, I'd find a bolt.

And he wasn't company for Andrea. He was company for me. He wouldn't leave either me or my micro alone.

Now you know me, I've nothing against animals. I throw bread to the birds, sign all the anti-vivisection petitions and I've never once been tempted to hunt a fox.

But if there's ever a Buster hunt then I'll be in it.

If I didn't know better I'd swear that A. had nobbled him. As soon as he arrived in the house he was upstairs pulling at all the plugs on my micro.

"He's only playing", crooned A. soothingly as he managed to get the plug out of the wall for the tenth time. "He misses Deidre, that's what it is".

How pulling the plug out on my Beeb compensated for the lack of his owner defeats me. As it was he soon learnt another method of attack.

From the start the keyboard fascinated him. He used to lie on top of the TV, his tail obscuring the screen ("It's warm there", A. cooed), every now and then extending a languid paw and pressing the odd key.

That I could put up with, but his next trick drove me berserk. How on earth could the dratted thing have figured out what happens when you press Ctrl and Break at the same time? I did see him sharpening his claws on my unopened copy of the Remedial Users Guide but I doubt if he'll have got much there.

Mind you, he must have got a very warped impression of the Beeb's OS. I can see him sitting there, watching the cursor with a terrible intensity thinking, "If I press that key and that one at the same time, not only do I get a hard reset but also Bob chases me down the stairs, screaming".

The real breaking point came when I was trying to fit the PhraseSage chip which I'd bought at the Romchester Rogues for a ridiculously cheap price.

"Is it genuine?" I asked. "It's a genuine copy", they reassured me, warming their hands on their Eprom burners.

Have you ever tried fitting those chips? They have 28 legs and there are 28 holes in the socket, but will they go in? No, they won't. Yet Mike Cook makes it sound so easy. Does he use some kind of lubricant?

Eventually frustration got the better of me and I started cursing the chip, my Beeb and life in general. Since this was the manner in which I normally addressed him, Buster thought I was calling him, and came to see what was happening.

He arrived just as the PhraseSage chip took flight for the hundredth time. I think it was the high-pitched "ping" that startled him, but whatever the reason it was a frightening but magnificent sight.

With one mighty leap he caught the chip as it ricocheted off the pelmet and was off down the stairs and out of the door with me in hot pursuit of my £20 worth of word processor.

As I hurtled through the hall A. was talking to Deirdre on the phone. "Oh, he's no trouble", I heard her lie, "Bob's playing with him now".

And that's how I came to be in a neighbour's garden screaming "Give me my chip back" up a tree. I suppose the whole thing would have been less painful if it had been the right tree. But the policeman was very understanding.

As was the man from the RSPCA.

Yours,
Bob

PS: You know that Micro User game where you have to rescue a cat from a well? I've modified it. I leave it to you to guess how.

What has the latest Electron User got for BBC Micro users?

The answer's simple . . .

LISTINGS!

Pages and pages of them. Games, graphics demonstrations, utilities, they're all there. Also there are hardware reviews, hints and tips, regular features like Casting Agency and Sounds Exciting, Pete Bibby's beginners articles and the graphics series.

electron user
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All Electron User listings will work on BBC Micros with OS 1.2 and Basic II. Even with Basic I machines and earlier OSs the vast majority of the programs will work without modification.

The August issue is even better than ever. Continue the large letters saga with John Woollard or, if you're in the mood, smash up some of Roland Waddilove's brick walls. Should you be feeling more constructive, then try saving sandcastles (or even skydivers) from the sea. The beginners' article goes one more STEP into the world of FOR . . . NEXT loops, while Program Probe dissects a program that dissects user characters. There's also a utility that scrolls strings sideways. All this and more is ready for you in the August edition of *Electron User.*

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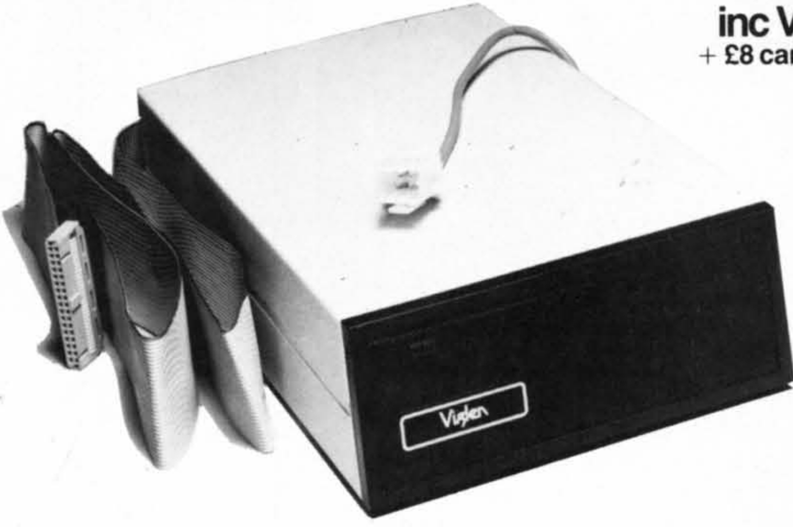

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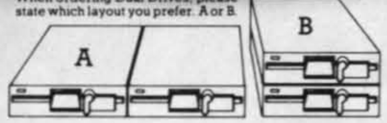

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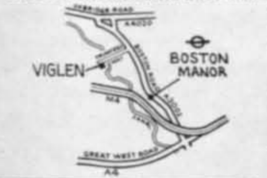

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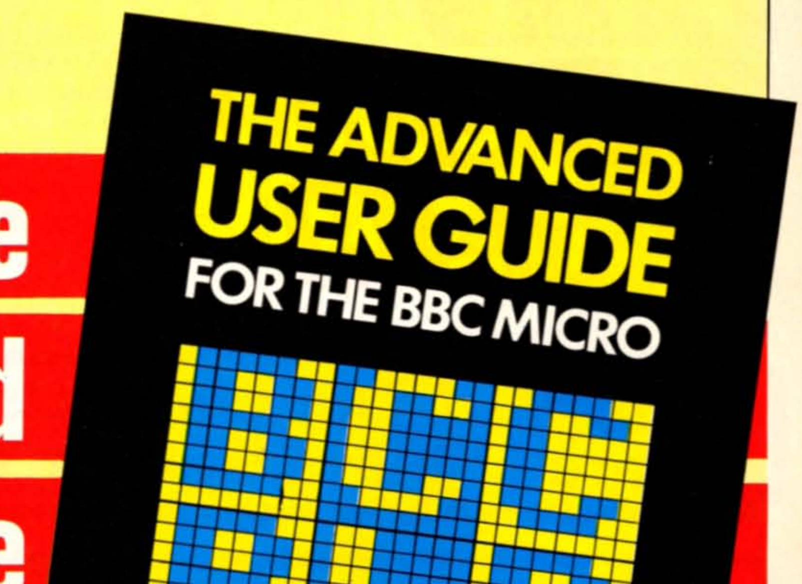

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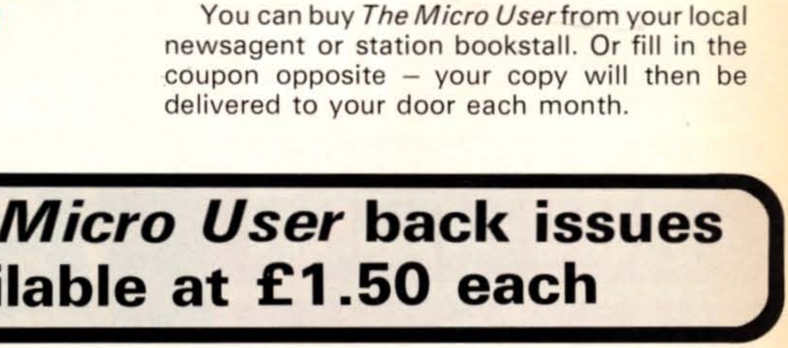

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MARCH: Mazemunch, block-busting arcade action. **Birthday,** family fun for our anniversary. **Derrick,** number fun for infants. **Pixelpen,** high resolution for lightpens. **Loadtape,** a recovery utility. **Plus** 18 other programs from the pages of *The Micro User*.

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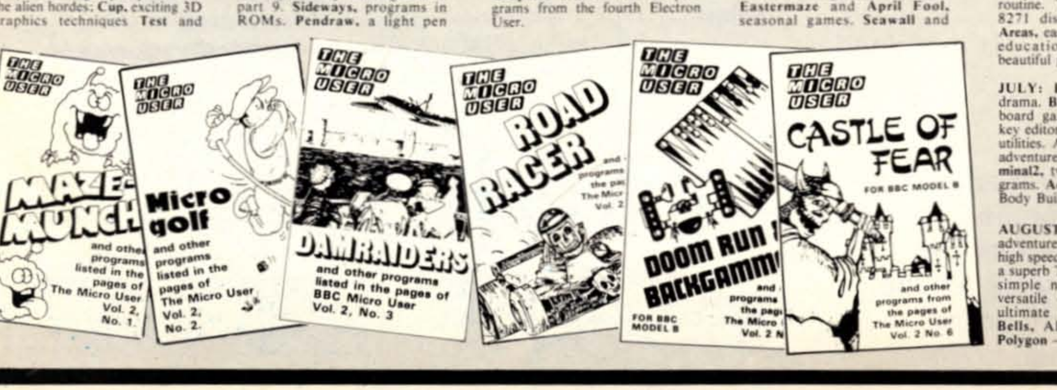

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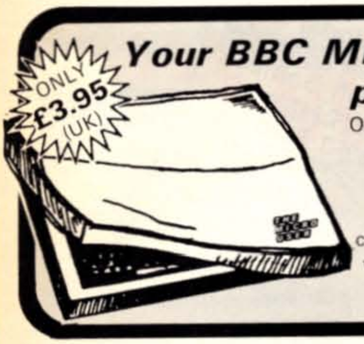

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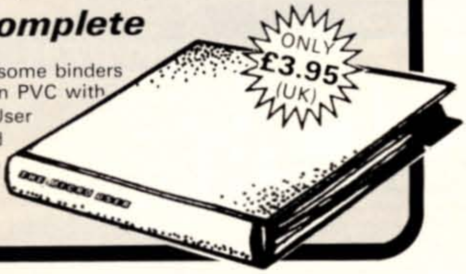

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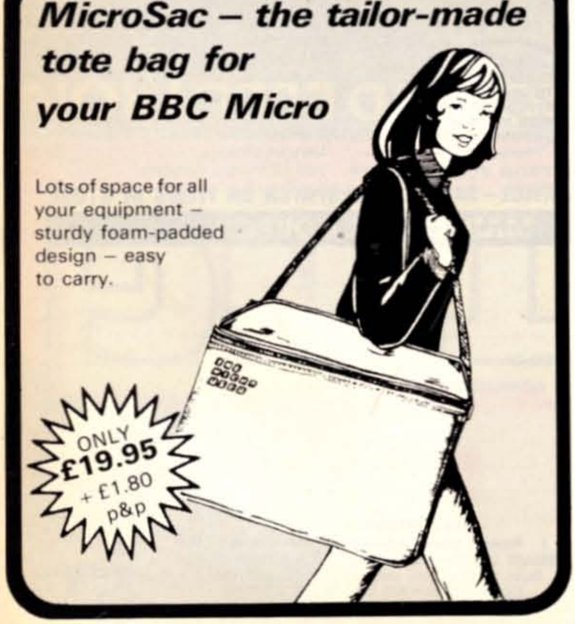

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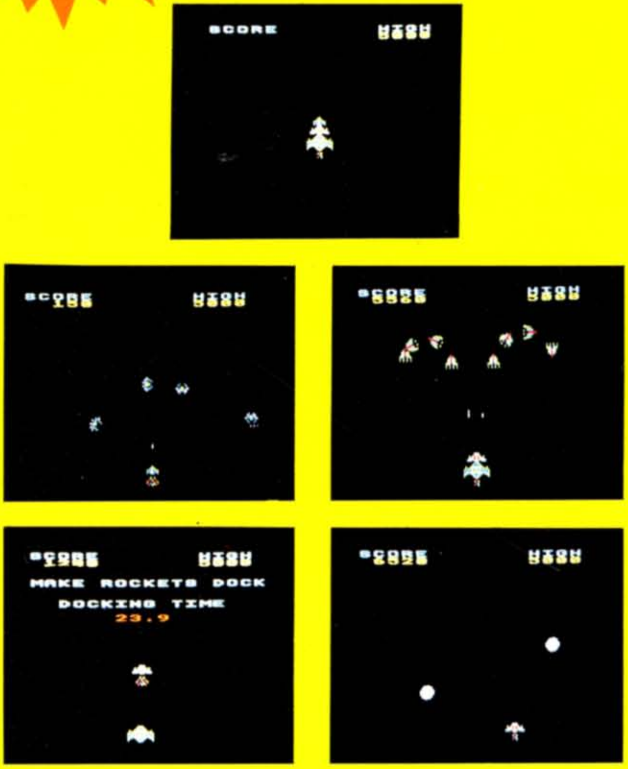

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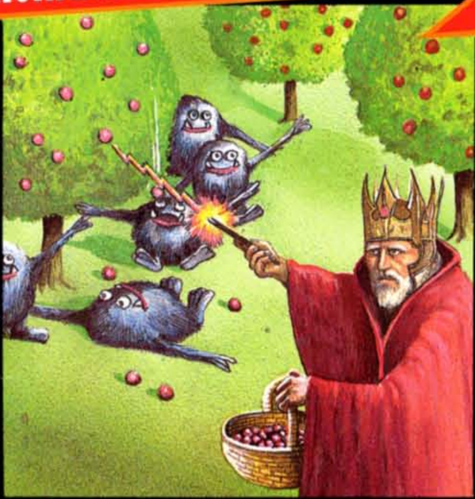

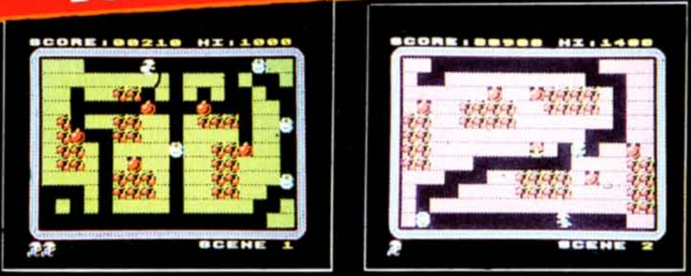

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